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[Anderson, Charles Frederick]

ARCHITECT'S

REPORT AND PLANS

FOR THE IMPROVEMENT OF THE

LIGHTING, HEATING, VENTILATION, AND ACOUSTICS

OF THE

SENATE CHAMBER,

AND

Hall of the House of Representatives,

PREPARED

BY ORDER OF THE JOINT SELECT COMMITTEE OF THE SENATE AND HOUSE
OF REPRESENTATIVES,

DECEMBER 2, 1864.

Honble Senator Collamer

Senate Chamber

WASHINGTON, D. C.:
McGILL & WITHEROW, PRINTERS AND STEREOTYPERS.
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Aug. 15, 1889.

To the Honorable the Joint Select Committee of the Senate and House of Representatives of the United States, on the subject of Lighting, Heating, Ventilating and Acoustics of the two Halls of Congress:

The report of Chas. Fred. Anderson, Architect and Civil Engineer, of the city of Washington, D. C., most respectfully represents—

That in obedience to your appointment and directions, made in pursuance of the concurrent resolution of the two Houses of Congress of the 10th of May last, the undersigned has diligently applied himself to a minute examination of the various parts of the North and South Extensions, and to the various plans and drawings of their several parts which will necessarily have to be used or which will be slightly affected by the plan by which he proposes to improve the lighting, heating, ventilating and acoustics of the Halls of Congress, with a view to discover the most direct, easy, and economical manner in which the plan can be applied to the structure as it now exists.

This examination has the more strongly and clearly developed the errors of those parties having charge of the construction of these Extensions, in departing from the plans which the undersigned had the honor to furnish for the accomplishment of these objects, and which had been submitted to President Fillmore, and was supported by Mr. Webster, then Secretary of State. During the administration of President Pierce these same plans were submitted to him, and fully examined and approved by Montgomery C. Meigs, then Captain of U. S. Engineers and Superintendent of the Capitol Extension, and by Professors Bache and Henry, and was also approved by the Secretary of War, under whose directions the works had been placed, as will fully appear by the documents appended to this report; and yet, strange as it may appear, Captain Meigs, in his actual construction of the Extension, not only rejected this plan for the lighting, ventilating and heating of the Legislative Halls but actually reversed the whole system, making the error radical, and therefore more difficult now to remedy or cure. However, by a thorough study and examination of all the parts, the undersigned flatters himself that he has (by his accompanying plans) established the means of making the desired improvements with the least possible alteration or change in the interior arrangements; none, in fact, which will occupy any material apartments or space of the Extensions, or injure or interfere with the present appearance and arrangement of the Halls of Congress in any way, except to lighten up and greatly improve their interior appearance, as well as the exterior superstructure; all of which will be shown and explained by this report, and by the the drawings and plans therewith submitted.

The erroneous plan adopted by Captain Meigs, which has been operating since the occupation of the Halls and is now existing in both Houses, receives the exterior air under the ground floor from off the surface of the overheated and dusty terraces, furnishing much of the bad air from beneath, carried to its surface by evaporation and side currents of air from the ground, and this air is also tainted with much of the odors caused by the machinery near which it passes.

The atmosphere produced by these causes is drawn to the openings in the cellar or sub-basement walls by the action of the fan-wheel, which forces it up under the floors of the two Houses, where it finds vent through the gratings under the member's desks, the risers in the floors, and openings round the Halls, and in the galleries. By the action of these currents the poisonous vapors introduced from below raises from the floors of the Halls, and keeps in constant motion the vitiated air generated by the breath of the persons occupying the floors and the galleries, which carbonic acid gas, being heavier than the purer p rt of the atmosphere of the chambers, is constantly tending to and settling upon the floors, and would remain upon the floors like unto a malaria or noxious miasm were it not kept in motion near the floor by the currents of dirty air coming up through the gratings and registers ; there is added to this bad air all the dust produced by the walking or movements upon the floor, independent of the dust from off the flagged terrace, as heretofore described. This atmosphere of the Halls, as at present arranged, although not perceptible to the sight, cannot be otherwise than unwholesome, and were it not for the frequent opening of the doors leading into the Halls, would prove much more oppressive and intolerable than it is. To persons of weak lungs, however, the deleterious effects of the present arrangement are more immediate and sooner felt than by persons blessed with more robust constitutions ; but even these may be taken sick without any apparent cause unless it can be traced to the fact that the seeds of the sickness may have been unconsciously imbibed while sitting quietly in their seats, and much more so, while engaged in speaking or in the heat of debate, when the lungs must of necessity become inflated and irritated by this pernicious atmosphere.

From these remarks it will be manifest to the plainest understanding that the great error has been committed in attempting to furnish the proper air to the Halls, passing through and mixing up with the vitiated air as above explained, instead of introducing the pure air into the upper elevation of the Halls, and drawing down the impure atmosphere through the gratings in the floor. Having thus simply explained the errors of the present system, it is the purpose of the undersigned, in obedience to the directions of the Honorable Joint Committee, given in pursuance of the concurrent resolutions of the two Houses of Congress, to explain the principles and the manner in which he proposes to remedy the existing errors and defects, and furnish to the National Councils a pure, temperate, and refreshing atmosphere, of an equal temperature at all seasons, in which they may with safety exercise their lungs while conducting the high and important legislation of the country, with ease and pleasure, and without any apprehension of receiving injury from the medium through which their views, arguments, and business transactions may be expressed in the two Houses.

To accomplish this purpose, the undersigned will endeavor to be as succinct as the nature and the importance of the case will admit of, and with this view will divide his explanations into the following sections, viz :

SECTION 1st. The undersigned proposes to furnish an abundant supply of fresh, unadulterated air, rarified in winter, hydrated, purified, and cooled down to any desired temperature in summer, to the Halls of Congress, so as to insure a uniform temperature at all seasons, with a healthy atmosphere ; to be effected by vertical air shafts, to be built on the banks on the west side of the Capitol Extension, one for each wing, twenty-five feet high over the level of the flagged terrace, and in the position marked on the accompanying plans of the sub-basement floors, (*specified by the red tint;*) through these shafts pure air, procured from that elevation, will pass into the air chambers on the sub-basement floors, through dry tunnels, seven feet six inches in diameter, built of hard brick and cement twelve inches thick, and cemented on the inside, so as to make them impervious to damp, with a fall to the vertical shaft, in which shaft a jet of pure water will play at discretion, and be capable of adjustment in the engine room.

In the sub-basement air chambers are iron stands on which to pile ice in hot weather, and through which the hydrated and purified air will have to pass to the fan-wheel, which will force it upwards through the building to the upper air chamber arranged outside of the chamber walls, and from which it will pass into the Halls of Congress through close air-tight ducts, made of two thicknesses of thin galvanized sheet iron four inches apart, filled in between with crushed pumice stone and liquid cement, passing through the perforations in the ceiling as through a sieve—this perforated portion of the ceiling forming the under side of these air ducts.

The large upper air chamber outside of the Halls will be arched over with brick and cement, so as to render them impervious to the influence of the exterior atmosphere, either hot or cold, and the air ducts on the ceiling, which are fed directly from these large air chambers, are packed on three sides with non-conducting material, as before described, so as to transmit this purified, cooled, (or rarified,) air to the Halls without being sullied on its passage through the atmosphere over the glass ceiling.

The undersigned has arranged four new fan-wheels to carry out his plan, two to force the air up and two to withdraw the vitiated atmosphere from the floors; one for each House. These are so formed as to possess five times the power of the present fan-wheel, but which power is completely under the control of adjustment as the flow of air into the Halls may be required, which will be regulated by the speed of the fan-wheel, which depends on the action of the engine.

When very cool air is required in excessive hot weather we can lower the temperature of the exterior atmosphere to any extent desired in the Halls of Congress, by placing ice in the vertical shaft as well as in the lower air chambers, and still further by the use of salt with the ice.

All this air passes from the vertical air shafts through the tunnel, which will be built into and covered up from the effects of the atmosphere by the present bank of earth extending to the basement air chambers, and from thence up through the building to the upper air chambers which supply the air ducts over the ceiling; will be made close, clean, and pure, with a drain built at the bottom leading to the vertical shaft from the lower chamber and the ice cellar, and to take off the water introduced by the jet, the melting of the ice, or the rain water in the vertical shafts.

The undersigned has also annexed the adjoining cellars in each wing (now useless) for stores or ice houses, where a supply can be kept convenient to the lower air chambers for daily use when required. In cold weather steam admitted through the cluster of pipes now in use, but placed in the new air passage, will rarify the air to any temperature required on its passage to the upper air chamber, through which chamber a stream of pure water will be made to flow so as to hydrate the heated air before it enters the Halls. The temperature of this air on its passage will receive additional protection at certain seasons by the admission of air through a register from the upper air chamber to the space over the glass ceiling; and the influence of the exterior atmosphere will be kept off the glass ceiling by means of a counter ceiling, placed on the back of the iron rafters which support the roof and the ceiling, which rafters I have found it necessary to strengthen to double their present capacity. This counter ceiling will be composed of crushed or broken pumice stone, filled in with liquid cement, resting on thin corrogated galvanized sheet iron; it will be five inches thick, packed close, made air-tight, and plastered on top with cement. This counter ceiling will prove to be a non-conductor of heat, cold, or sound from the exterior copper covering of the roof, leaving a space of three feet between the exterior covering and this counter ceiling.

This plan will effectually prevent the changes in the weather either by heat, cold, or storms, to affect the glass ceiling, as it does at present, and which has been so much complained of; in fact, the temperature of these Halls could never be properly regulated so long as the exterior atmosphere could control the temperature of the space over the glass ceiling, which is at present assimilated to a hot-house in summer and an ice-house in winter, besides transmitting noise from the effects of hail and rain storms, so annoying to the members of both Houses of Congress. It will be only fair to all parties that it should be known that this system of lighting the Halls of Congress by means of sky-lights is the only part of Mr. Walter's two designs which has been brought into operation by Captain, now General Meigs, and which injudicious act is a principal cause of the heated ceilings and bad acoustics.

The undersigned proposes, as an extra or auxiliary means of heating the Halls of Congress in very cold weather, to place ornamental benches covered with marble slabs in the angles of the Halls and in the hat-rooms, filled with coils of steam pipes to supply additional heat on the floor of each House, which will obviate the necessity for heating the upper current of air too highly to be pleasant.

Section 2d. The undersigned proposes to withdraw the heavy atmosphere or vitiated air from the chambers without its remaining any time above the floors to become injurious to the occupants, and at the same time to regulate and insure good acoustics to both Halls of Congress.

To accomplish these objects, the present system will have to be completely reversed, by using the same apparatus for withdrawing the vitiated air from the Halls of both Houses and from the galleries as is at present used for admitting the air into these apartments, being the registers on the floors, in the galleries, and in the screens which inclose the Halls, &c., &c.

This will be accomplished by means of powerful fan-wheels, made to work in the passages which at present admit the air, and in as close proximity as possible to the openings under the floor, through which these fan-wheels will withdraw the vitiated air; the power of these exhausting fan-wheels upon this air can always be regulated to a certainty by their velocity, which will be controlled by the action of the engine.

The current of fresh air passing through the Halls downwardly will also be regulated in a great measure by the action of these exhausting wheels, which will regulate the acoustics, as will be made evident from the fact that the voice can no longer ascend to the roof and be lost in the space over the ceiling, as at present. The compressed air forced through the perforations in the ceiling, as through a sieve, will oblige the voice to remain in the body of each House; it being an axiom in the science of acoustics, that glass, next to water, monopolizes the greatest attraction for sound. The attraction of the voice produced by the glass-paneled ceiling over both the Halls of Congress, as at present, will be obviated altogether by the introduction of the imperceptible flow of pure air into each House from the ceiling; as sound always accompanies the current of air, it will be decoyed from the glass ceiling, and conveyed into the body of the chambers and into the galleries, as above described, without a reverberation of the voice produced by the present low glass ceiling. The proposed elevation of the glass ceiling, besides improving the architectural proportions of the chambers, will materially assist in establishing good accoustics, as the large field of attraction for the voice will be further removed from the floor, besides being intercepted or arrested on its passage to the ceiling by the incoming flow of pure air through the many apertures in the ceiling, and a greater space will be afforded for the action of that incoming current to mix with the air in the chambers before it reaches the floors. The undersigned recommends that the system heretofore specified in the printed explanations which he furnished to Captain Meigs, in 1853, be now adopted for conveying and dispersing the superabundance of sound on the floors to the galleries, and to the reporter's desk in particular, by inserting open slits in the surrounding screen, to which will be attached zinc tubes, which will arrest the voice and convey its redundancy from off the floor to the galleries. It will be perceived that by this system the voice cannot escape from the Halls in consequence of this plan for admitting the pure air, and by means of these tubes the vibration of the voice or echo will be altogether done away with, so that the full effect of the voice will be rendered more agreeable by this wholesome atmosphere, produced by purified and compressed air. It will be seen, by the accompanying plans, that this change can be effected without interfering with the arrangements on the floors or galleries in either House, or the surrounding corridors, passages, or offices, in any way save by the occupation of one or either of several spaces, the selection of which may well be left to the Honorable Committee on the Public Buildings, or any other authority deemed most appropriate, to select a passage for the pure air from the basement to the upper air chamber, which can be spared with the least inconvenience, that is, if the passage laid down on the plans for the Senate wing be not approved of. With this exception, it will be perceived by the drawings that this plan for securing good ventilation, &c., &c., interferes with nothing in the Halls that can be visible under the level of the cornice of the present ceiling which surrounds the Halls of Congress; everything below that level will remain as at present arranged. According to this plan it will be perceived that there are two objects to be attained, first, to establish what is required by the concurrent resolution, and second, that it may be effected with as few changes and at as small an expenditure of time and money as is possible; such a change, however, in the present Halls of Congress, might be considered cheap at any cost, as it will insure the health of the nation's representatives.

SECTION 3d. This plan will furnish a good and agreeable, direct light by day from windows opening on the exterior atmosphere, with a steady, clear gas light by night descending through the present glass-paneled ceiling, as elevated, but without the accompanying heat produced by the great number of gas burners at present distributed all over the ceilings of the two Halls of Congress, numbering about one thousand four hundred over the ceiling of the House of Representatives alone, the effect from which renders the heat of the glass and iron ceiling particularly oppressive.

To remedy the present defects, it is proposed to raise the ceilings over the two Halls of Congress about sixteen feet, which will produce much better proportioned apartments, as the height of the present ceilings are altogether at variance with architectural rule, or the laws which govern architectural proportions. This change, together with improving the architectural appearance of the Halls, will afford room to insert a tier of windows extending all around each Hall under the cornice and over the gallery doors, as shown by the accompanying longitudinal and cross sections. These windows will be the exact size of the windows in the committee rooms on the basement floors; a direct light will be admitted through the upper half of these side windows, twenty-six in number in the House, and twenty-two in the Senate, as well as a borrowed light through seven of the end windows in the Senate chamber, and through nine of the end windows in the House of Representatives. The upper half of the sashes will open on pivots, and when open will admit the air through the halls from the exterior atmosphere, but which will never be required in consequence of a sufficient supply of better air being at all seasons within command by means of the above arrangement; besides, open windows would of necessity damage the acoustics. These windows would be hid from exterior view by the erection of the high parapet, (called an attic in architecture,) on which will be placed the present balustraded battlement, and which is recommended in Senator Foot's report as necessary to relieve the present bad effect of the upper monotonous straight line of the whole building, which is at variance with Roman architecture, (the style of the Capitol building.) The increased elevation of the wings is further called for in consequence of the enormous size of the new dome, (copied from the dome of St. Paul's in London,) the new dome of the Capitol being fully one third larger than it has a right to be if constructed in accordance with the rules which govern the order of Roman architecture to which the Capitol building belongs. A dome is a prominent ornament to a classic structure, but always subordinate to the proportions and style of the building; but in our case the building is made subordinate to the dome. The published remarks of an educated northern tourist are particularly applicable, when he terms it, "The great dome, with the low buildings beneath which form the Capitol of the United States." The base of this new dome is actually made to project the front walls of the building, and rest on the projecting portico which forms the principal entrance to the rotunda. To elevate the wings will in some measure disguise this architectural blunder.

Thus it will be perceived, that by this one plan two great objects will be effected—better light will be given and better proportions to the Halls, and at the same time materially improve the exterior architectural appearance of the building. (See accompanying Sections and Elevations.)

The new windows will be filled in with stained glass, which will produce a soft and agreeable light.

It is proposed to light the Senate chamber at night by means of eight circular burners of Frink's patent, with powerful reflectors, one placed over each; and the House of Representatives with thirteen circular burners, having a reflector over each, by which means the light can be increased to any amount desired, and the present objectionable heat from the great number of unprotected burners on the ceiling will be altogether done away with, as there will be placed over each reflector a copper dome, surmounted by a copper chimney eight inches in diameter, passing out vertically through the roof, which must attract all the heat upwards, while it reflects all the light downwards. To elucidate which the undersigned submits the accompanying drawings of Frink's patent reflector, which he would recommend as the best means of lighting the Halls of Congress..

The air which this plan introduces through a register from the upper air chamber into the open space between the glass ceiling and the new counter ceiling, will increase the draft upwards from the burners under these reflectors and over the glass ceiling, through the flues over the reflectors, which will remove the possibility of communicating any heat from the burners to the glass ceiling, while the counter ceiling will protect the glass ceiling from the influence of heat or cold from the exterior atmosphere.

The undersigned begs leave to submit a drawing of Reigart's improved fan-wheel, by which he proposes to supply and control the pure air to be furnished to the Halls, and to draw the vitiated air therefrom.

He also begs leave to submit specifications and detailed estimates for the construction of the different works more fully described by the plans for the alterations, which he has the honor to submit in obedience to the instructions of the Honorable Joint Committee.

To remove all apprehension upon the subject, the undersigned would respectfully state that these plans will not interfere with the present condition or appearance of either of the Halls below the level of the present glass ceiling, while the arrangements above will establish better architectural proportions, symmetry, and beauty to these Halls, a desideratum which he trusts it will not be considered out of place for him to say would have been effected in the original construction of the North and South Extensions of the Capitol, had his plans been fully and fairly carried out.

Desiring to confine this report to a plain and simple statement of what has been required of him by the joint resolution and the directions of the Joint Committee, the undersigned has omitted to introduce any reference to the authorities sustaining the principles of the plans which he has the honor to propose; but to aid the judgment and strengthen the opinions of this Honorable Committee and those of the Honorable Members of the two Houses, who are so deeply interested in the subject-matter under consideration, he would beg leave to append notes, communications, and reports of high authorities, thereby removing the idea of any presumption on his part of presenting a plan whose principles had not been fully established by science and practical experience, and which fact the undersigned made himself fully aware of before he submitted his first design, in answer to the published invitation to the architects of the United States, in the year 1850, by practically investigating the different systems for ventilating public buildings in Europe, in particular the Bank of England, the United Service Club House in London, the new British Houses of Parliament, the Millbank Penitentiary, and the Pentonville Model Prison. He investigated the system of ventilation adopted in the two last-mentioned establishments under an order from the Home Secretary, Sir James Graham—which order will be found recorded in the visitors' book during the summer of 1845—a copy of which could be had through our representatives in London, which will at once prove his practical experience of this system which he has all through advocated. Under these circumstances, the undersigned can with confidence assure the Honorable Committee that there can be no possible doubt as to the result, on which assertion he will stake his professional reputation, as well as on the certainty of being able to successfully carry out the necessary alterations during the interval between the end of the present Congress and the regular annual meeting of the next Congress.

For the more minute and particular explanation of his plan, the undersigned begs leave to submit the following drawings, viz:

Senate Wing.

No. 1.—Plan of sub-basement floor, showing the alterations.
No. 2.—Plan of basement floor, showing the alterations.
No. 3.—Plan of the principal and upper floors, showing the alterations.
No. 4.—Longitudinal section of wing, showing the alterations.
No. 5.—Cross section of wing, showing the additions.
No. 6.—Section showing the vertical air passage.
No. 7.—Plan of air ducts over the ceiling.
No. 8.—Front elevation of north wing, showing the attic.
No. 9.—Drawing of Reigart's improved fan-wheel.
No. 10.—Drawings of Frink's patent reflector.

House of Representatives.

No. 11.—Plan of sub-basement floors, showing the alterations.
No. 12.—Plan of basement floor, showing the alterations.
No. 13.—Plan of principal and gallery floors, showing the alterations.
No. 14.—Longitudinal section, showing the additions.
No. 15.—Cross section, showing the alterations in roof.
No. 16.—Section showing the vertical air passage.
No. 17.—Plan of the air ducts over the ceiling.
No. 18.—Elevation of the south wing, showing the additions.
No. 19.—Estimate, &c., from competent parties.

All of which is most respectfully submitted by

CHAS. FRED. ANDERSON,
Architect and Civil Engineer, Washington, D. C.

December 2, 1864.

APPENDIX.

Extracts from Charles F. Anderson's printed explanations of his second or modified design for the Capitol Extension, with extracts from the works of eminent writers on ventilation and acoustics, &c., all of which were furnished to Captain Meigs by his desire, and for his information, immediately after he (Captain Meigs) had been placed in charge of the Capitol Extension in 1853. In proof of these facts reference can be made to Colonel Alexander, of the United States engineers, now in charge of the defences of Washington, as it was Colonel Alexander who brought C. F. Anderson to Captain Meigs; also to General Hickey of the Senate, who was present in Captain Meigs's office at the time when C. F. Anderson surrendered to Captain Meigs his second or modified design and plans for the Capitol Extension in good faith for the use and benefit of the Government, for which Captain Meigs promised that he would see that C. F. Anderson should be liberally remunerated; but instead of so doing, after using C. F. Anderson's plans, and aggrandizing himself at the expense of C. F. Anderson's professional knowledge, time, and labor, he gets shut of the obligation by referring C. F. Anderson to Congress to get paid, after he (Captain Meigs) had publicly stated in his printed reports to Congress that he was the author of C. F. Anderson's design and plans, &c., &c.:

1. I have proposed from the beginning, (in December last,) to enlarge the Capitol by wings of ample dimensions to the north and south of the present building, and separated on each side by an interval--joining each wing to the centre building by a connecting lobby forming an ample passage on each floor of the building, which is fully exemplified in my plans. This feature was a distinguishing characteristic between my design and every other plan submitted under the advertisement. It was my original conception, which no argument could remove, and it has afforded much satisfaction that the President has so far honored me as to adopt it—to arrange the Senate Chamber, audience room, conference rooms, Vice President's room, rooms for the Secretary's office, Senate Library room, Senate Post office, water closets, private stairway from the ground floor under the eastern portico for the members, two stairways from the north front to the galleries and the Reporters' rooms, and a corridor outside the Senate chamber, capable of being made private between the Senate and the rooms above mentioned. On this floor there will be three fine porticos for the comfort and convenience of the members. It is proposed to inclose the Senate Chamber by mahogany wainscot, with metallic panels, reaching up to the gallery floors, to prevent the sound of the voice from being lost under it; and to shut out noise and currents of air from the exterior, which would be fatal to the hearing properties of the room. This wainscot will be made a sounding or transmitting medium to the voice, and will be pierced by three doorways for entering and retiring from the Senate. Under the Senate floor will be placed the apparatus for drawing from the Senate Chamber the vitiated atmosphere, or carbonic acid gas. The gallery floor next to the wainscot work will be fifteen feet from the floor of the Senate, with a gradual rise from the front to the back of the gallery, so that the audience sitting on the back seat may see the speaker on the floor of the Senate. The thirty-four windows for lighting the entire room, and for admitting air at pleasure, to accommodate old prejudices, if required, would be above the gallery. The ceiling of the entire room would be appropriately and richly decorated with patriotic emblems and ornamental painting. The President's chair is placed in the centre of the longitudinal side of the room, in order that each member may be in the nearest practicable line to the chair. The arrangements for the reporters would be two small galleries, connected with rooms, to each of which there will be a telegraphic arrangement for the transmission and reception of information and despatches, There would be two separate stairways leading to the gallery on the north side, and one main entrance to the

gallery on the south, connected with two separate stairways in the old north wing of the Capitol, affording free ingress and egress sufficient to clear the galleries in a very short period of time.

The machinery for the introduction of pure air from the exterior will be simple, and be located in the lower parts of the building, where it will be prepared to suit the season, and forced up by a sure mechanical process through the ducts in the walls, having outlets over the cornice of the walls, and flowing into the chamber in controllable and regulated quantities, to suit the number of persons in the House and galleries, heated by a process preserving the salubrious qualities in the air, and to preserve a given temperature in the room in the winter, and cooling down the external atmosphere in order to supply air of a given temperature in the summer. So that at any season of the year, whether but a few persons be in the room or it be crowded to excess, the temperature may be preserved uniform at any required degree, and the hearing maintained without interruption or diminution. An apparatus will be placed under the floor of the Senate, which, by withdrawing the vitiated atmosphere or carbonic acid gas, will keep the atmosphere of the room always pure, whether few or many persons be congregated therein, as its power may readily be exerted to correspond with the demand for its use. These will not now depend upon chance, according to the mistaken ideas of some persons, but will depend upon, and be regulated by, certain fixed principles, sustained by strong and unquestionable living authorities, some extracts from whose printed works are submitted to the President with this communication, in accordance with his wishes. To attain this desirable end, however, the entire building, its foundation, its walls, its size, its interior arrangements, and every particular connected with it, must all be calculated and constructed in direct reference to it: that is to say, to the light, ventilation, hearing, and adaptation of the halls to the comfort and convenience of the two Houses of Congress, collectively and individually; and if the converse of this view be adopted, and the Houses be constructed without this all important end in view from the beginning, it may be too late, when they are completed, to provide these indispensable qualities in the building.

It must now be considered as an axiom in modern architecture, that to obtain and preserve a pure, temperate, and regular atmosphere, and to secure an easy exercise of the lungs, clear enunciation of the voice, and a perfect hearing in large assembly rooms, there must be no sudden nor cross currents of air, admitted by open windows or doors from the exterior, nor even from an elevated position, for the reason that those currents cannot be regulated or controlled as may be required, and would not act nor enter with sufficient impetus into the room, without the existence of a force of wind or a breeze without, and the establishment of a strong current by openings on different sides of the room, which would decoy the voice, render it difficult to speak, and interrupt or destroy the hearing. This being avoided, and the other cause of difficulty in speaking and of oppression of the lungs, to wit, the impure atmosphere, or carbonic acid gas, being regularly withdrawn by the unfailing apparatus under the floor, the desired objects must infallibly be attained. To allow these principles to operate properly, the interior structure and finish of the room, the materials to be used, and the mode of finishing them, must all have a proper adaptation; at least, they must not be directly at variance with those principles, or form obstructions to their easy operation. For instance, if there were pillars, or columns supporting the galleries, or those galleries should protrude from the enclosing wall into the Senate chamber, instead of the close wainscot extending from the floor of the Senate to that of the gallery which I have placed there, the consequence would be, that the voice would be confused by the columns, and, penetrating under the galleries, would there be lost. Pillars resting on the gallery floors, and supporting the ceiling, would also have a confusing effect to the sound; and, generally speaking, all avoidable projections or recesses forming cavities would have the same effect, and must be scrupulously avoided. These facts, however, need not deprive the room of those reasonable and proper ornaments and embellishments which a becoming regard to the dignity of the National Assemblies, as well as to the national taste and judgment, requires. Meagre, indeed, would be the resources of architectural knowledge did they not furnish abundant ideas and means to give elegance and grace to such rooms, as well as the most perfect adaptation of them to the uses and purposes for which they were intended. Independently of the other important uses of the mahogany wainscot, (which should be of hard wood with metallic panels, all having a fine-polish,) it can be made, by the employment of a peculiar form of conductors of sound, to receive the voice, and convey it through direct channels to every part of the galleries, receiving and directing thereby, for a useful purpose, the redundancy or excess of sound which might otherwise produce a confusing echo, and interfere with the hearing. In reference to all these matters, which are of such vital importance in the construction of such rooms, I am compelled by candor to say, that there is existing at this time a lamentable want of information, generally so much so as to enable obtrusive ignorance to attempt to lead astray the best intentions, directed by a well ordered judgment.

At the same time that my plan has reference principally to the application of the above mentioned principles to the Houses of Congress, I have furnished in my design a self-acting arrangement for the ventilation of these Halls, when the mechanical plan is not in operation, by means of four exhausting shafts in each wing, which will be found sufficient at some seasons when the mechanical plan is not in operation, and neither of these plans would interfere with the natural ventilation by means of the windows and doors, which I persist in declaring can never be depended upon.

For the better understanding, by the President, of the principles of ventilation and acoustics herein mentioned, I beg leave to submit herewith, for his consideration, a number of extracts from several highly respectable living authorities, which your Excellency has already expressed a wish to see, and which will be found to support the plans presented and the principles adduced in these remarks.

3. The preceding remarks, under the second head, being explanatory of the new north wing and the apartments for the Senate, will equally apply to the new south wing and the apartment for the House of Representatives, with some slight modifications to suit the difference in the size and circumstances of that House and its galleries, and every advantage and convenience intended for one would be secured to the other. This view of the House of Representatives is shown by a separate plan now before the President.

EXTRACTS.

Extracts from "Illustrations of the theory and practice of ventilation, with remarks on warming, exclusive lighting, and the communication of sound," by David Boswell Reid, M. D., F. R. S. E.: published in London, 1844; *pages* 72 *&* 73.

121. I. Were ventilation made a primary consideration in construction, and designs formed in unison with those laws that admit of its most economical application, it would be much less expensive than when appended to buildings previously designed or already built; and advantage might be taken of many alterations which would necessarily diminish the expense incurred specially for it. For instance, numerous apartments are daily constructed of a much greater altitude than is required where systematic ventilation is introduced, for the purpose of giving an ample supply of air; in such appartments, though air is longer in being vitiated, it is also longer before it is purified, when once vitiation has taken place. But, with systematic ventilation, a pure atmosphere can always be sustained within the zone of respiration, though the walls of the apartment be not elevated higher than the heads of those who may occupy them. The economy effected by reductions of altitude in individual apartments, though only amounting to one or two feet on each floor, would, in most instances, amply repay any expense incurred in improving the ventilation.

122. II. Were central shafts preferred for ordinary purposes, whether for individual houses, public buildings, or for commanding streets, squares, or districts, the permanent economy and improved health which would necessarily attend their introduction ought not to be forgotten in estimating their actual cost.

123. III. In individual appartments, an ingress and an egress for air, controlling valves, and such diffusion as the numbers likely to occupy each appartment might render necessary, forming the great essentials of ventilation, a great expense would not be necessary if the requisite means were introduced in the original structure.

Chapter IV, page 310.

691. There are, perhaps, few, except public speakers and singers, who are led to consider the extent to which the respiration of those that speak or sing is affected by the facility with which sound may be communicated in different buildings. All those whose engagements lead them to exercise their voice much in public, are, in general, well aware, that in some rooms there is comparatively little effort required to render it distinctly audible; while in others, the system is soon as much exhausted by the laborious efforts that are necessary for this purpose, as the attention is distracted by the forced exertion and peculiar emphasis or cadences with which it may be requisite to speak, in order that they may be understood.

692. The difficult communication of sound in any building is a grievous tax upon the strength, the time, and the attention of any public speaker, and if not the actual cause of death in some cases, where a great exertion had to be often made beyond the powers of the constitution, has at least too often assisted its premature arrival, by the extent to which it undermined the constitution.

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The comparative unity of temperature and movement of air through the house, also facilitates unity and distinctness of intonation.

The soft, thick, porous, and elastic hair cloth carpet allows all communication from place to place to proceed without producing any noise, while it is perfectly pervious to the excess of sound which escapes through it to the air chambers below.

The double windows, which have not been opened once during the last seven years, and the mode by which the air enters and escapes from the house, have effectually excluded the great interruption formerly caused by noise from without.

In rooms lined with sonorous metals, the slightest effort of the voice is heard with extreme distinctness, and to many with a keenness and intensity which is painful, unless the sound be very subdued. The effort is proportional to the sonorous nature of the metal employed. In metalic tubes of considerable size the sound may be conveyed for miles.

704. If secondary revibrations be considerable in any apartment, while a primary tone is still sustained by any one continuing to speak, and if the door be open through which the sound can escape freely, it sometimes is observed that the voice can be more distinctly followed from without than within; the primary sound alone extending to any distance beyond the walls, while the minor sounds are lost before they can proceed so far.

705. Proximity to a reflecting surface is always favorable both to the speaker and hearer, unless the discharge or excess of sound be insufficient.

710. In many halls and galleries. with arched roofs or domed ceilings, the amount of interruption caused by the curved surface is always contingent upon the form of the curve, upon the nature of the material of which the reflecting surface is composed, and the distance of the hearer from the curve. If he be in the focus, the resonance will prove offensive in general; but if the floor on which he stands, or his ear, be at a distance from it, whether above or below the focus, the sound will be more or less equal or pleasing, according as its intensity is more or less uniform throughout the whole apartment.

There are many public buildings in which the communication of sound is so imperfect that it is no exaggeration to state, that the efforts of the speaker to be heard, and of those that listen to hear, detract very largely from the effective value of the discourse.

715. The stillness of an audience, and the exclusion of external noise, form very important elements in considering the communication of sound in public buildings.

717. Those who are interested in this subject will find, in general, that where the communication of sound is imperfect in the construction of public buildings, it may be remedied according to the acknowledged principles of acoustics, and particularly by providing an escape for excess of sound.

720. But there are few localities where numerous facts might not be accumulated, such as have been adverted to in regard to the communication of sound, illustrative equally of the power of the voice and of the air in a still atmosphere; and the general conclusion appears to be, that few buildings have yet been constructed too large for the human voice to fill, where excessive reverberation can be subdued, and where the unity of the atmosphere is preserved.

726. The highest supply is required in autumn, when the air is warm and moist, the wind imperceptible but inclining from the east, the barometer low, the ground moist, and the tide full. Fifty thousand cubic feet per minute are scarcely sufficient then to sustain comfort in a crowded house; extra power is given, and the other appliances resorted to which have been stated.

Extract from " A Practical Treatise on warming and ventilating building," by Charles Hood, F. R. S., F. R. A. S, etc., London, 1844, 2*d edition ; chap.* 3, *page* 232.

269. Probably no subject connected with the health and vigor of the mind and body deserves more and receives less attention, than the condition of the internal atmosphere of our houses and apartments. Attempts are indeed occasionally made to introduce some system of ventilation in public buildings, but they are far more frequently unsuccessful than otherwise, in consequence of the arrangements not having formed part of the original plan.

Chapter IV, page 268.

307. The different modes of producing ventilation may all be classed under two general heads—the natural and the mechanical. All the methods of spontaneous effusion, produced by the unequal density of two columns of air, whether caused by chimney draughts or otherwise, belong to the former class; while the various other methods of ventilating by fans, pumps, and other similar contrivances, belong to the latter class. Of these different modes, the mechanical is the most effective; the natural generally, but not always, the most economical.

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The method of spontaneous ventilation which has been described requires, in every case, that the air of the room to be ventilated shall be of a higher temperature than the external air. In very hot weather, and with crowded assemblies, this method is generally insufficient to secure a wholesome and comfortable state of the atmosphere. But artificial means have long been in use for increasing this effect. This is accomplished in two ways —either by heating the air in the upper part of the ventilating tube, which causes it to ascend with greater rapidity, and thereby to draw it out of the room or building; or by causing the air of the building to pass through a furnace, from which all other supply of air is excluded. Both these plans have been extensively used, and both answer the intended purpose. The principal theatres of London are ventilated by the former method, advantage being taken of the heat of a large chandelier placed near the ceiling in the centre of the house. The heat of this chandelier causes a great rarefaction of the air and increases the draught; and it thence passes out through tubes into the open atmosphere, the building being supplied with fresh air from below. The method of ventilating, by causing the vitiated air to pass through a furnace, has also been long and extensively employed. Thorough ventilation can only be procured by two methods—draught by heat, or mechanical ventilation by a fan; but the latter of these methods possesses so many advantages over the former, that it appears surprising it should, for so many years, have been neglected; and that, of all the numerous plans which have been tried for ventilating the late House of Commons, the draught by heat, though applied in various ways, has been the principle of them all. Dr. Ure has written a useful memoir on the subject of ventilation, in which he compares the advantages of these two methods: and he estimates the relative cost of ventilating by a fan, compared with that by chimney draught, as about 1 to 38.

318. The efficiency of the mechanical method of ventilation by a fan, turned by machinery, has been proved so extensively in some of the largest manufactories, that it appears singular that Dr. Reid should have adopted so cumberous and expensive a contrivance as that which he has erected at the present House of Commons, Whether or not this method of ventilation be adopted in the new Houses of Parliament, there can be but little doubt that ultimately the more simple, efficient, and economical plan of ventilating by a fan will be resorted to.

320. The mechanical method of ventilation appears to possess many advantages. It is of course only suitable for extensive buildings, on account of the cost of erection and maintenance of the apparatus being too great in any case, except where a large quantity of air is required to be withdrawn. The usual plan is either to employ a rotary fan to draw out and discharge the air, or a pump, which answers the same purpose.

Extracts from " Improvement of school-houses in the United States," by Henry Barnard; New York, 1849. *Page* 49.

The ventilation of factories, mines, reading-rooms, and halls intended for large assemblies of people, has received of late much attention from men of science and large practical views in England. In factories, the large apartments are heated by steam or hot-water pipes, and the air, which has been vitiated by breathing and perspiration, is drawn out by a fan ventilation. This contrivance resembles somewhat our common fanning mill, or machine for winnowing grain. The impure air of the room is drawn into the fan to supply that which is condensed by the revolving wings, and forced out through a pipe leading to the open air.

In the House of Commons, the rapid change of air is effected by means of an artificial draught in a chimney erected on the outside of the building, and in which a large fire is kept burning for this purpose solely. The fresh air from without is first introduced through a perforated wall into a chamber below, connected by doors with an apartment containing the hot-water apparatus for warming the house. The pure air can then be warmed or not, according to the season of the year, before it passes into the apartments above. This is done, not by rising in a large volume through one or two openings, but imperceptibly through a large number of very small holes in the floor. The air thus admitted, after becoming vitiated by respiration and combustion, escapes through apertures concealed in the ornaments of the ceiling into a common flue or receptacle above, which is connected by a descending pipe with the chimney noticed before. In warm weather, the air, before passing into the house, is cooled and freshened by jets of water playing through it, and by the melting of bags of ice suspended in the chamber below.

The rooms of the Wellington Club, Liverpool, are warmed and ventilated in nearly the same way. The air from without is first cleansed from all particles of coal dust, and other impurities, by being passed through water, and then brought to the right temperature by steam-pipes in the air chamber below. It is then forced into the room by a revolving fan, through a band of minutely perforated zinc, which skirts the large apartments. Concealed in the ornamental work of the ceiling are openings, communicating with an air chamber above, in which is a chimney shaft, and in the draught produced by a fire in this the vitiated air is carried off so rapidly that the odor of a small quantity of rose water poured into the air chamber below is, in a few seconds, perceptible in every part of the room.

Extracts from " Ure's Dictionary of recent improvements." New York, 1845. *Page,* 270

I take the liberty to observe, that the system of heating and ventilating the Reform Club House offers some striking and peculiar advantages, introducing, during the sultriest dog days, refreshing currents of air, at a temperature of 10, 20, 30, or even 40 degrees under that of the atmosphere. Of such cool air a very gentle stream would suffice to make the most crowded apartments comfortable, without endangering the health of their inmates with gusts of wind through the doors, windows, and floors.

It is lamentable to reflect how little has been done for the well being of the sentient and breathing functions of man in public buildings, notwithstanding our boasted march of intellect, and diffusion of useful knowledge.

On the 6th of June, 1836, I took occasion, in a paper read before the Royal Society upon the subject of the malaria which then prevailed in the custom house, to investigate the principles of ventilation by the fan, and to demonstrate, by a numerous train of experiments, the great preference due to it, as to effect, economy, and comfort, over chimney draught ventilation. Yet, at this very time, the latter most objectionable plan was in progress of construction, upon a colossal scale, for the House of Commons. About the same period, however, the late ingenious Mr. Oldham, engineer of the Bank of England, mounted a mechanical ventilator and steam-chest heater for supplying a copious current of warm air to the rooms of the engraving and printing departments of that establishment. Instead of a fan, Mr. Oldham employed a large pump to force the air through the alternate cells of his steam-chest. He had introduced a similar system into the Bank of Ireland about ten years before, which is now in full operation.

About two years ago, Messrs. Easton and Amos were employed to ventilate the letter carriers' and inland office department of the General Post Office, of which the atmosphere was rendered not only uncomfortable, but insalubrious, by the numerous gas lights required there in the evenings. This task has been executed to the entire satisfaction of their employers, by means of fans driven by steam power. The said engineers made, about the same time, a set of machinery similar to that erected at the Bank of England, for warming and ventilating the Bank of Vienna.

The cheering and bracing action of condensed air upon human beings formed the subject of several fine physiological experiments made a few years ago by Mr. James. "When a person is placed," says he, "in condensed air, he breathes with a new facility; he feels as if the capacity of his lungs was enlarged; his respirations become deeper and less frequent; he experiences, in the course of a short time, an agreeable glow in his chest, as if the pulmonary cells were becoming dilated with an elastic spirit, while the whole frame receives, at each inspiration, fresh vital impulsion. The functions of the brain get excited, the imagination becomes vivid, and the ideas flow with delightful facility. Digestion is rendered more active, as after gentle exercise in the air, because the secretory organs participate immediately in the increased energy of the arterial system; and there is therefore no thirst."

Extract from "Elements of Physics or Natural Philosophy," by Professor Arnott, M. D., of the Royal College of Physicians. (Philadelphia, 1831.)

Respiration and voice, from page 490 to 519, taken from Acoustics, or Phenomena of Sound and Hearing, from page 388 to page 119, to which reference is made.

Extracts from the "Report on the Ventilation of Pentonville Prison," by the British Jail Commissioners and Major Jebb, who designed the prison known as the Model Prison: London, 1844, *page* 18.

It will be observed that an apparatus for warming the air, when required, is placed in the centre of the basement story of each wing. This apparatus consists of a case or boiler, to which a proportion of pipes, adapted for the circulation of hot water, are attached. In connexion with it there is a large flue, open to the external atmosphere.

The fresh air introduced through this opening, after passing over the surface of the boiler, turns right and left along a main flue, which runs horizontally under the floor of the corridor, and from thence passes upwards through small flues preserved in the corridor wall, which terminate, respectively, in a grating placed close under the arched ceiling of each cell on the three stories. A current of air may thus be introduced from the exterior into each cell; and it is obvious that it may be warmed, or left at its natural temperature, as circumstances may require.

The channel for the introduction of fresh air would, however, be of little avail in furnishing the supply required, unless corresponding arrangements were made for extracting the foul air from the cells, which under ordinary circumstances is the first movement that will take place.

A grating is placed close to the floor of each cell, on the side next the outer wall, and diagonally opposite to the point where the fresh air is introduced. This grating covers a flue in the outer wall, opening at its upper extremity into a horizontal foul-air flue in the roof, which communicates with a vertical shaft raised twenty or twenty-five feet above the ridge.

It will thus be seen that a communication is established, first, from the outer air through the warming apparatus to the top of each cell, and thence from the floor of each cell, upwards, through the extracting flues and ventilating shaft, into the outer air again.

Professor Johnson's Certificate.

To Charles Frederick Anderson, Esq.,
Architect, 44 *Wall street, New York.*

Dear Sir: After a careful inspection of your plans and sections for the additions to the Capitol, and reflection upon your explanations for ventilating, acoustics, &c., I have no hesitation in saying, that my knowledge of the authors you name confirms your judgment, and that, practically, you will arrive at perfection in these important requisites; and I may further add, that there can be nothing to prevent the due execution of your plans. To secure perfect ventilation, a proper temperature at all seasons of the year, *and first acoustic qualities*, the examination of your plans and sections, and the explanation of them, has afforded me much pleasure; and, on due reflection, I cannot conceive any other method so well adapted to secure the ends in view.

Allow me, therefore, to trust that your patient perseverance, skill, and judgment, will be rewarded by the national adoption of your plans.

I am, dear sir, yours, very truly, JOHN JOHNSON.

New York, *May* 31, 1851.

Office of the Extension of U. S. Capitol,
Washington, *May* 19, 1853.

Hon. Jefferson Davis, *Secretary of War:*

Dear Sir: Having verbally, in my interview with the President and yourself, fully explained the proposed changes, with the aid of large drawings showing the accommodation to be afforded, it is not necessary here to enter into detail. [*These were the drawings furnished by C. F. Anderson.*]

I will only repeat my own conviction, that the proposed change will secure a better room for speaking and hearing, and better accommodations for the members and officers, and business of the House.

I have prepared some notes upon the application of the general principles of acoustics and ventilation, which have guided me in devising the plan which I propose.

They contain the views I expressed to you verbally, and which I propose to write out for submission to some gentlemen of eminent scientific reputation.

While I feel confident that I am correct, I shall be happy to be sustained by their approval if right, and will be much better satisfied to be corrected if wrong, than to be permitted to go on and fail in so important an undertaking.

The changes which I recommend in the plan of the south wing, in order to carry out the above views, are shown upon drawings which have already been explained to you. [*C. F. Anderson's drawings.*]

I would like to have an opportunity to show them to the gentlemen to whom you will refer these notes.

To lay down general principles correctly is not sufficient security that the application of them will be judiciously made.

I am, sir, very respectfully, your obedient servant, M. C. MEIGS,
Captain of Engineers in charge of Capitol Extension.

Extracts from "Notes on Acoustics and Ventilation with reference to the new Halls of Congress," by Captain Meigs, United States Corps of Engineers; May, 1853.

Experience shows that the human voice, under favorable circumstances, is capable of filling a larger space than was ever probably enclosed within the walls of a single room.

If sound be prevented from spreading, and losing itself in the air, either by pipe or an extensive flat surface, as a wall or still water, it may be conveyed to a greater distance.

A pure atmosphere being favorable to the speaker's health and strength, will give him greater power of voice and more endurance: thus indirectly improving the hearing by strengthening the source of sound, and also by enabling the hearer to give his attention for a longer period unfatigued.

The common mode of warming and ventilating public rooms is fatal to perfection of hearing.

One or several columns of intensely heated air are introduced through holes in the floor. Being much warmer than the air of the apartment, they immediately rise to the ceiling. If the exit apertures for foul air are above, this fresh and heated air above escapes, having done nothing for the apartment except to cause whirls and currents, such as we see in a column of smoke passing from a chimney on a calm day. The irregular refraction of sound through these currents of equal density tends greatly to produce confusion.

If the exits for foul air are below, the hot air accumulates at the top of the room, and, gradually displacing the cooler air, forces it out through the passages.

Professor Reid relates that he has found the air near the ceiling of a room at the boiling temperature while those on the floor were complaining of cold.

Here we have a strata of different densities and unequal refractive power, and hence confusion of sound.

As the warmer air must ascend to the top of the room, I propose to let it do so in a large trunk outside of the apartment, pass into a space above the ceiling, and thence, by numerous holes, find its way, as through a sieve, into the room.

By a steam-driven fan, or other mechanical means, we can pump air, in any desired quantity, into any spot into which we choose to direct it.

I would drive all the air required for the supply of the room through a maze of hot-water pipes, raising the whole of it to the temperature desired—60° or 80°, as the case might be.

If the room be thirty feet in height, and it be desired to change all the air in it every fifteen minutes, enough air should be pumped in above to cause a general descent of the whole body of air in the room, at the rate of two feet a minute.

This would be an imperceptible current. The exit should be by numerous holes in the floor, perhaps through the carpet, or the risers of the platforms on which are the members' chairs.

Three important advantages would thus be gained ; The avoidance of all eddies, a nearly homogeneous and tranquil atmosphere, and the immediate removal downwards of any dust from the carpet, which would thus be prevented from rising, to be inhaled into the lungs.

To prevent the disturbance and contamination of the atmosphere by the gaslights, I would place them above the glass of the skylights—the space between those in the ceiling and those in the roof being separated from the chamber into which the fresh air should be admitted.

In summer, the same apparatus which sends in warm air in winter would supply a constant breeze; and, if the temperature of the external air was too high, it might be cooled by jets of water from pipes in the passages, or even by melting ice.

I feel confident that, by observing the above prescribed precautions, we will obtain rooms as near perfection as is possible—"rooms in which no vitiated air shall injure the health of the legislators, and in which the voice from each member's desk shall be easily made audible in all parts of the room." [*This is C. F. Anderson's plan.*]

This was the problem proposed to me for solution.

In conclusion, I have the honor to repeat the request made verbally some days since, that the above notes and observations may be submitted to some person of scientific reputation, the weight of whose authority may sustain me if I am right, or correct them if wrong.

Respectfully submitted to the Hon. Jefferson Davis, Secretary of War, by his obedient servant,
M. C. MEIGS,
Captain of Engineers, in charge of Extension of U. S. Capitol and Washington Aqueduct.

Extract from Secretary Davis's Letters and Professors Bache and Henry's Report.

WAR DEPARTMENT, WASHINGTON, *May* 20, 1853.

GENTLEMEN: Captain Meigs, of the corps of engineers, has submitted some notes upon acoustics and ventilation in reference to the construction of the new hall for the House of Representatives.

By direction of the President, who is desirous of obtaining the best scientific authority within reach upon this subject, I enclose them for your perusal, with a request that you will give them such consideration and make such remarks upon them as you think proper.

The importance of this subject to the convenience and health of Congress will be a sufficient excuse for troubling you thus far.

If you will appoint a time for an interview, Captain Meigs will lay before you the drawings showing the plan of construction which he proposes.

Very respectfully, your obedient servant,
JEFFERSON DAVIS,
Secretary of War.

Messrs. A. D. BACHE, LL. D., and JOS. HENRY, LL. D.

WAR DEPARTMENT, WASHINGTON, *June* 7, 1853.

SIR: You will accompany Professors Henry and Bache to Philadelphia and New York and Boston, if they desire it, and assist them in making such experiments in regard to the acoustic phenomena of some of the public rooms in those cities as they may think necessary to enable them to report upon the proposed alterations in the plans for the south wing of the Capitol extension.

JEFFERSON DAVIS, *Secretary of War.*

Captain M. C. Meigs,
Engineer in charge of Extension of U. S. Capitol.

Sir: The undersigned have examined, as you requested, the principles proposed by Captain M. C. Meigs, of the Corps of Engineers, with reference to the acoustics, heating, and ventilation of the Hall of Representatives. [*Mr. Anderson's report copied by Captain Meigs.*]

They are now prepared to report that the principles presented to them by Captain Meigs are correct, and that they are judiciously applied.

They are of opinion that the plans should be provisionally adopted, in order that the building may not be delayed, subject to such modifications in the details as may result from the further study of them by Captain Meigs, or from the experiments and observations of the commission.

This general adaptation of the plans will not, it is believed, interfere with any changes of details likely to be found desirable.

Very respectfully, yours,

A. D. BACHE,
JOSEPH HENRY.

Hon. Jefferson Davis, *Secretary of War.*

New Hall of Representatives, Washington, D. C.

Comments by C. F. Anderson on Speaker Orr's certificate and Captain Meigs's letter, published in the "Washington Union," on the 21st August, and in the "New York Times," on the 28th.

I have read with surprise a letter from Captain Meigs, superintending officer on the works of the Capitol extension, accompanied by a certificate from the Hon. J. L. Orr, Speaker of the House of Representatives, on the subject of the acoustic properties and ventilation of the new Hall.

As Captain Meigs claims this "to be a subject of interest to the world as *a question of science*, and to the people of the United States especially," as sufficient grounds for the publicity of his communication, may I beg in a double sense to claim a similar privilege, by taking on myself to change the opinions of the Honorable Speaker, and set Captain Meigs right as to what scientific ventilation and acoustics are; as by his acts he has proved himself wanting such knowledge by his giving *the scientific world* to understand that *a scientific act*, carried out on a bad and discarded principle, could be made effectual and of value to the *scientific world*, which I will prove to him to be a delusisn. In support of this strange doctrine he seduces the Honorable Speaker of the House into a similar belief, so as to give color to his own acts.

Before I would presume to differ in opinion with Mr. Orr, I wish it to be understood that any explanation I make as to the certificate, which, in the goodness of his disposition, he was induced to give Captain Meigs, must not be construed into disrespect on my part, as my object is to protect the *scientific world* against the mistaken principles which have been adopted in the carrying out of my design for the building in question, as the principles I laid down in my plans, and for the carrying out of which I submitted printed instructions, as well as verbal explanations, to Captain Meigs, have been by him altered in many particulars, both as regards the arrangement of the interior, the architecture, and the acoustics, and ventilation in particular. But, as I am informed, it will be a question before next Congress, (*who authorized these changes,*) I will refrain from making any further comment.

The halls of Congress are now arranged in appearance as laid down in my original plan, so far as their particular position and shape, with the disposition of the Speaker's bench, the seats, and desks, reporters' gallery, and telegraph offices, but differing in the lighting and heating, as well as in the principle of ventilation and acoustics. He supplies the air to the halls by means of a sunken area of about fifteen feet long by four feet wide on the flagged terraces, at the side of each wing, with openings through the basement wall, through which the air passes directly to the fan-wheel or blower. After being heated on the side of the building and being mixed with the dust on the terrace, it is forced into the houses or halls of Congress through the vacant space under the floor and is discharged through registers in the screen behind the members' seats; also through apertures in the risers and in the floor under the members' feet, and from thence down their throats in the state it comes off the terrace floor, bringing with it a large portion of dust, which has proved quite offensive, and ultimately must prove most injurious to the health of the members. *So much for the enlightenment of the scientific world by Captain M. C. Meigs.* This air from the exterior, after being forced into the hall by means of a fan, is conducted through the open passages that radiate to the Speaker's desk. As the members are seated in a semi-circular position around him, each having his face to the Speaker, with the air forced in from behind them and under their feet, it is therefore evident that the voice must follow the current of air to the Speaker's bench; but unfortunately, there the perfection of the acoustics end, as the superfluous air passes up through the perforated glass ceiling perpendicularly into the vacant space under the iron and glass roof that covers each of the new wings, in which space over the ceiling every word said below can be distinctly heard. Sometimes when the gallery doors are left open, to cool the house, the air rushes through them, when the voices of the members are heard, that is, if the current of air is escaping in that direction. This fact became so well known at the latter end of last session that numbers, as well as myself, stood at the open doors to hear what the member speaking said, instead of remaining in the galleries, where we could hear badly if at all. Therefore, I take it for granted, that Mr. Orr went to the gallery doors and heard what was saying on the floor of the hall, and on his own bench he cannot avoid hearing well, and feeling more comfortable than any other individual, as the only current of air admitted is always blowing towards his seat from every side. He is, therefore, correct in stating what he has written, so far as he is individually concerned when in the Speaker's seat, or was led to suppose when inspecting the galleries. When that forced air strikes the screen behind the Speaker's bench it ascends upwards and through the perforations in the ceiling, and carries with it the voice, as is evident from the reporters not being able to hear in their galleries behind the Speaker's bench what is said on the floor. We have sundry certificates to that effect from under their hands. As for myself, I can rarely hear what is saying on the floor by any member when in the galleries, and on two occasions I was allowed into the hall, but could not hear what was saying by the member that stood before me at a short distance, for the same reason, that the voice was blown in the direction of the Speaker's chair, at the same time depriving every other part of the House of a like advantage. Of course, in hot weather, the air and voice is attracted into the vacant space over the ceiling, and passes up vertically with great velocity, as the air in the halls becomes highly rarified from the effect of an over-heated iron and glass ceiling. The engineer had to force all the air up the fan could master or the ducts carry, to render the House tolerable and keep off the effects of the over-heated ceiling. The result was, that during the latter sitting a resolution was offered to adjourn to the old House again to save the members' lives; at the time many of the members had to use caps made of newspapers, and some held books over their heads to keep off the effect of the heated air from the ceiling. This proved worse at night, when the gas was lighted in all the burners over the ceiling. This error was relieved as much as possible by only lighting a portion of the burners the last nights of the session; they could only abate the heat by reducing the light. The thermometer generally stood at the time about 140° on the ceiling, 110° in the galleries, and 87° on the floor of the House; at the same time on the terrace from which the air came, the thermometer stood at 90°. Thus you perceive that the action of the fan, and in the short passage from the outside of the wall to the inside of the House, the heated air is reduced three degrees.

As I have explained accurately the blunders committed in the ventilation and acoustics of the new halls of Congress, I will, for the sake of the scientific world, and the members of Congress in particular, state the arrangements that were made by me for establishing pure and healthy ventilation, insuring a pleasant atmosphere at all seasons; and such were the impressions made on the ex-Secretary of War that, when applying for the last appropriation, he described the ventilation and the principles of acoustics I laid down on my plan accurately. He has since stated to me that he always supposed Captain Meigs had acted in accordance with these principles, and he was not aware that Captain Meigs had authority to make changes. But the Captain evidently wished to establish a little originality for himself, although at the time he took charge of the Capitol works he acknowledged he knew nothing of architecture, his only experience being in repairing forts on the northern frontier. When I surrendered to him my plans and printed instructions, which I prepared by the desire of President Fillmore, to enable Mr. Walter to conduct the works, although before the President was influenced by Walter's friends, he had marked this same Mr. Walter's plans rejected. Yet he employed that man to commence that building. Nearly all of his work had to be taken down by Captain Meigs; yet, odd to say, Captain Meigs retained him at a salary of $4,500 per annum; and that after the Senate committee's report on the frauds practiced while the works were under his (Mr. Walter's) direction. This act on the part of Captain Meigs was no doubt to keep me from filling my legitimate position, although being an American citizen and an architect of forty years' experience, whose plans won many public premiums, where acoustics and ventilation were tested, before competing for the honor of designing the extension to the Capitol of the United States. My plans will always prove me to be the architect who designed that building; therefore, Captain Meigs would do well not to be stating in his report what I have in my power to contradict; he makes little of himself by so doing. He has been the military superintendent, most unprecedently employed to carry out an experienced architect's design, which he has mutilated to a shameful extent, making the United States Capitol a burlesque on science. The original plan was arranged to have as pure air as could be procured, collected by the means of shafts erected in the park before the Capitol, connecting with metal tunnels about seven feet diameter, extending into the base of each wing, the air thus brought in to be forced up by fan blowers through sundry air ducts to the ceilings of the halls, where it was to discharge equally all round from off the projecting shelf of an architectural cornice, thereby mixing with the air in the hall before it descended to the members' mouths. This kind of compressed and mixed air being acknowledged by the ablest authorities as the best and most healthy for orators to breathe. I arranged four large air shafts, one in each angle of the hall, each three feet six inches in diameter, through which I discharged the vitiated air and dust by means of a perforated floor, with rotary fans in the flues, worked by universal joints; by this method you confine the voice to the hall of the house, and never admit impure air or dust to rise off the floor. I arranged to have polished metalic pannels in the screen, with registers inserted into them, opening into numerous invisible pipes conducted to every part of the galleries and the reporters' desks, for the purpose of dispersing all over the House the excessive reverberation or echo produced by the voice of a speaker on the floor, thus rendering the voice distinctly heard in every part of the House and galleries, doing away with all injurious currents of air, and with that deafening echo that now assails the ear to such an unbearable extent in every part of the house save the Speaker's desk, which stands in an open space, with every voice and the everlasting current of air directed towards it.

In the passage of the air from the park to the House, I arranged to have it purified, hydrated, and cooled down in hot weather by passing it through gratings loaded with ice, so as to admit it into the halls at any temperature required, say at 65 degrees steady when the exterior atmosphere was 90 degrees, (or at a lower temperature if required,) doing away with a heated ceiling altogether, and both halls enjoying the benefit of a delightful, pure and healthy atmosphere, both in winter and summer, with unfailing acoustic properties. The same apparatus will supply the rarified air in winter, and will introduce it into the halls on the best acknowledged principles. In support of these assertions, I refer to Professor Reid's work,s pages 72, 73, 310, and 317. Also, Professor Hood's works, chap. III, p. 232; chap. IV, 268 and 276. Also, Barnard's work on ventilation, page 49; supported by Ure's "Dictionary of Recent Improvements," page 270; not omitting Arnold's "Elements of Physic,' from 119 to 388, and from page 490 to 519.

These authorities were highly approved of by President Fillmore's Cabinet, particularly by the late Mr. Webster, who stated that "this doctrine of acoustics and ventilation was sought after and approved of by every enlightened nation, and no doubt we will have to come to it yet, as no climate requires such a system more than our own." Mr. Fillmore requested me to make out a written statement of this system with reference to what the different authorities said on this subject, which I did. He next wished me to stake out the present wings on the ground, which I also did, in the presence of him and many of his Cabinet, Mr. Walter and his supporters standing by.

Captain Meigs, not understanding architecture himself, subjects him to the imposition of many pretenders. This I know to be a fact. I have no doubt that there has been more money wasted by his incapacity than would pay twenty-five educated architects, one of whom would have constructed the work creditably.

CHARLES F. ANDERSON, *Architect.*

The following extracts from a communication from the ex-Secretary of War, with remarks from General Meigs, will throw further light on this subject. (*See Ex. Doc. No.* 20, 36*th Cong.*, 1*st ses.*, *page* 164,) viz:

When the construction of the Capitol extension was put under my general direction, as Secretary of War, the discredit brought upon the manner in which the work was prosecuted, by congressional investigation and legislation, required that the charge of the work should be transferred to other hands than those of the architect who had previously administered it, and the reputation of Captain Meigs, with whom I had no previous personal acquaintance, induced me to select him, and upon my recommendation he was put in full charge of the work. Charged with the study of the difficult problems involved, for the solution of which the highest scientific attainments were essential, and being invested with full authority to make all needful changes in the administration of the work, he was informed that upon him would rest the responsibility of a proper and economical construction of the buildings. Thenceforward, Mr. Walter became his subordinate, and was only retained in employment by the generous solicitation of Captain Meigs. Upon the great scientific problems involved in the principal objects of the extension, it will be found that

Captain Meigs was put in consultation with Professors Bache and Henry. It certainly never occurred to me, and as far as I know it did not to Captain Meigs, to take advice of Mr. Walter.

Even in matters of architectural style, a reference to the accompanying photographs will show how important have been the modifications of the original design.

The following are General Meigs's remarks in page 168 of the same report:

Mr. Walter's entire unfitness for such a work is well enough known to all men of science who know him at all.

It has been a curious phenomenon to me, that, with so much taste in form, and so much knowledge of architectural detail, a man can be so entirely incapable of understanding or appreciating any matter requiring scientific knowledge.

Yet I doubt not that he will be able to make plans satisfactory to the persons pressing for the work, whose object, I presume, is less the most perfect and economical mode of heating and ventilating the building than the expenditure of a certain liberal portion of the public money.

GEN. MEIGS'S REPORT.

When the charge of the Capitol extension was committed to me in April, 1853, my attention was particularly directed by the Hon. Jefferson Davis, Secretary of War, to the great importance of providing rooms suited by their acoustic qualities, by their warming, ventilation and lighting, for the purpose of legislation. In his instructions to me on taking charge of the work I was told: "The great object of the extension of the Capitol is to provide rooms suitable for the meeting of the two houses of Congress—rooms in which no vitiated air shall injure the health of the legislators, and in which the voice from each member's desk shall be easily made audible in all parts of the room. These problems are of difficult solution, and will require your careful study."

I was fully impressed with the difficulty and importance of the question, for the whole vast expenditures of the extension of the Capitol may be said to have been incurred almost solely because the representative chamber in the old building was so unfortunate in its acoustic qualities. The great difficulty of speaking and hearing in it seriously affected the course of legislation. The influence of a member in debate depended too much upon the possession of strength of voice to make itself heard through the irregular echoes and reverberations of the hall, and many men, finding the effort to speak exhausting and injurious, were forced to abandon the attempt to exercise that influence upon the legislations of the country to which their talents and aquirements entitled them.

The defects of the room led to disorder and irregularity, and it was to be hoped that, if a room could be constructed in which an ordinary voice could be distinctly heard by every member on the floor, it would lead to a greater attention to the debates and a better understanding of the important subjects constantly coming before the House.

The results of my studies were a recommendation to abandon the plans of the legislative halls and the whole interior arrangement of the new wings of the Capitol as then under construction, and the adoption of plans which I had the honor of presenting. That of the new Hall of Representatives, as since constructed in the south wing, was presented to the Hon. Secretary Davis on the 19th of May, 1853, with a report upon the reasons for adopting it and the principles upon which it was based, which was printed in the annual report from this office of October 22, 1853. [*See Ex. Doc. No.* 1, 33*d Cong.*, 1*st ses.*, *part* 1, *pages* 79 *to* 84.]

Extracts from Captain Meigs's Report to Secretary Floyd, under date of the 27*th of October*, 1859, (*see Ex. Doc. No.* 2, 36*th Cong.*, 1*st ses.*, *pages* 353, 355, *and* 356,) *in which Captain Meigs admits the failure of the plan which he adopted for ventilating the halls of Congress.*

The use of the chamber showed some defects in the mode of introducing the large quantities of air required for ventilation.

Alterations designed to remedy these defects have been made during the recess. They are described in a subsequent part of this report.

An almost entire reconstruction of the floor thus became necessary, involving considerable alteration in the plans for ventilating the space occupied by the members.

When the Hall of Representatives is crowded, the supply of air needed in order to keep the atmosphere of the room perfectly fresh and sweet is sometimes as great as 160,000 cubic feet, or three and a half tons per minute, renewing the whole atmosphere of the apartment every five minutes. The introduction of this large quantity of air into a crowded assembly, without subjecting some portion of the audience to uncomfortable drafts, is very difficult, perhaps impossible. Many of the openings through which the air entered the room during the last session being necessarily closed up in rearranging the floor, I have substituted for these a series of registers in the floor, so arranged as to be under the control of the audience. Each of these bronze registers is furnished with a valve of small aperture, through which the air, entering horizontally, is diffused in a small cast-iron chamber below the floor, and then enters the room through a perforated bronze plate covered with wire gauze. The object of all this is to diffuse the air over as large a space as possible, and thus to introduce a large quantity with a small velocity. If any member find the air of the hall uncomfortably close, opening the register at his feet will supply him with fresh air. Should he find too much entering his immediate vicinity, he can shut it off.

Some inconvenience was felt during the last session by members near the registers in the walls of the room from the current of air. Deflectors have been attached to all these openings which causes the air thus introduced to take an upper direction, and thus prevent a direct current striking upon the persons near the walls. In the Senate chamber, though the areas of the openings for the admission of air had been made very large equivalent to 250 square feet of surface, which, when the supply of air was as high as 30,000 cube feet, or one ton per minute, would give an average velocity of air at the openings of only two feet per second. Still, the combination of all the feeble entering currents produced a general movement of the stratum of air in contact with the floor, from all parts of the floor, towards the Vice President's desk, which was sufficient to be felt as a draft, cooling unpleasantly the feet and legs.

The openings in the risers of the steps have now been all closed, and their place is supplied by small circular registers in the floor under each desk, by which air can be introduced or shut off at each seat, at the pleasure of its occupant.

Deflectors have been placed in front of the registers in the walls, which, as in the House of Representatives, gives an upper direction to the fresh air which enters through them.

Further comment is unnecessary, as Captain Meigs has, in the foregoing report, fully admitted the injurious effects of the system adopted by him for ventilating the Halls of Congress, as well as the utter ruination of their acoustic properties; to quote his own language in his notes on ventilation and acoustics, in which Professors Bache and Henry concur, *such a system would be ruination to the hearing of any apartment.*

The following extracts from Senate committee report No. 1, (special session,) March 22, 1863, will explain the cause of the changes made in the plans of the Capitol extension, and in the supervision of the works in 1853:

Examination of the testimony in the case leaves no doubt in the minds of the committee that great irregularities, and gross abuses and frauds, have been practiced in the business of directing, supervising, and executing the work of the Capitol extension, and that, in paying for that work, the public money has, so far, been expended in a wasteful and unwarranted manner, and, under existing contracts, will continue to be so expended, unless prompt and proper measures be taken to change the plan of operations heretofore pursued.

The testimony is so full and direct, in its bearing upon every point material to the opinion above expressed, that nothing more is deemed necessary here than to indicate, in the following brief summary, the leading facts which are proved by the witnesses examined, and confirmed in many important particulars, by the almost daily personal observation of the members of the committee. These facts are:

1. That large portions of the materials used in constructing the foundations of the building, and in the superstructure, so far as it has progressed, are of an inferior and improper character, unsuitable in quality, and not in conformity with the terms of the contracts under which they were furnished.

2. That owing to the inferior quality of the materials, or to other even less warrantable causes, much larger quantities of materials than were necessary have been furnished, in some instances, double the cost of the work, without improving in any degree the appearance or increasing the strength of the building.

3. That much of the work, especially in the foundations, has been done not only with inferior materials, but in a manner so inartistic as, in the opinion of the committee, to render it unsuitable and insecure for the purposes of its construction, and so unsightly as to reflect discredit upon the architecture of the country. So bad, indeed, have the committee found some portions of this work, that they are disposed to adopt the strong language of a distinguished gentleman, a member of the Senate, largely experienced in building, who, when examining it with two members of the committee, declared that, "Such work is disgraceful, and would not be permitted for the cellar-walls of a New England kitchen."

4. That systematic peculation and embezzlement have been practiced by persons intrusted with the superintendence and management of the work, by means of false accounts,

whereby large portions (in some instances nearly one-half) of the public money, charged to the Government as paid for labor, have been abstracted from the ostensible wages of laboring men, as the condition of their employment, and pocketed by the superintendent and his subordinates. Some idea may be formed of the amount of money absorbed by this species of "black mail" when it is known that, for a large portion of the time, the number of men employed upon this work has ranged from five to seven hundred per day.

5. That, in some instances, incompetent persons, who were not mechanics, have been employed for work in which experienced and skillful mechanics were required; and this not inadvertently nor ignorantly, but evidently as a mode whereby this "black mail" was more easily levied upon the Government and the laborer; and, in some instances, whereby the subordinate superintendents were permitted and enabled to receive full journeymen's wages for their own *apprentices.*

6. That more persons have been employed on the work than was necessary or proper, as may have been observed by every member of Congress in passing daily through the Capitol grounds while the work was going on; especially the work of moving material from the several depots to the walls, where, in many instances, eight or nine men, harnessed to a truck, were employed, at a cost of some $10 a day, to do what would have been easier and appropriate work for two men and one horse at $3 a day; and the work thus paid for at the greater cost performed in a manner so systematic, uncouth and slow, that, in view of the important mechanical processes of the present day, they would be amusing, did not the dishonesty in which they originate provoke their stern reprobation, and a due regard for the public interest require them to be arrested.

7. That the scaffolding around the walls, which, under the contracts, should have been made at the expense of the contractors, has been paid for by the Government, at an expense of many thousand dollars, as an unauthorized gratuity to contractors.

8. That, in various other ways, and in smaller amounts, the labor and materials paid for by the Government have, through the negligence or connivance, and, in some instances, by the direction of the persons in charge of the work, been converted to the private use of themselves and others.

The foregoing exposition, warranted and sustained, as the committee believe it to be, by the testimony adduced, goes far to account for the *inferior quality* and *small quantity* of the work already done, as compnaed with the large sums of money consumed by it; the foundations insecure and barely completed; the superstructure just begun; *one million of dollars expended!*

But the explanation of this will be complete and the fraudulent character of the whole transaction placed in the strongest and clearest light, by reference to the contracts for the "MARBLE WORK," as set forth in the foregoing abstract of testimony. These contracts, extraordinary as they are in their terms, are still more so for the ingenuity and boldness with which, in their execution, the employees of the Government have construed them in favor of the contractors and to the injury of the Government.

The difference in the prices, even as fixed by the contract, to be paid for the different sizes of the blocks of marble, is alone so extraordinary, and opens so wide a door to fraud, as to excite suspicion of unfairness throughout. That difference, it is seen, amounts to *more than two hundred per cent.* between blocks measuring less than thirty cubic feet and those measuring more than thirty cubic feet—the former costing only sixty-five cents a foot, while the latter costs $1 98 a foot! In the case of the piers between the windows, as shown by the diagram on the preceding page, in connexion with the testimony of the Commissioner of Public Buildings, the effect of this difference is clearly and strikingly exemplified. There it is seen that to fill a cubic space of thirty feet and three inches, this *peculiar feature of the contract* left it to the choice of the contractor to furnish marble at $19 66 or at $59 89, and to pocket the difference, or divide it with any confederates he might have, to the amount of $40 21. In this exemplification it will be seen, also, that there could be no sort of necessity, nor even advantage or convenience, to the Government, or for the character of the work, that a *single* block of thirty feet three inches should be used, instead of two blocks, each of fifteen feet one and a half inches, to fill the same space. Why, then, was it done?

It may be well understood, if, in any portion of the work, blocks of marble of extraordinary size, difficult to be quarried, inconvenient to handle, and expensive to transport, should be *required* for the strength or beauty of the building, that a large price would be demanded and might properly be paid for them. But the committee can hardly conceive an instance where, in the whole building, this excess of size in any single block of marble would justify the demand, or warrant the payment of more than *threefold* price for it. Certainly the committee do not find it in any portion of the work now done; and they are disposed to agree with the Commissioner of Public Buildings, when he says that of the 33,328 feet delivered in blocks measuring more than 30 cubic feet, which were delivered up to the 14th of February, not one was required of that large size. Why, then, were such received and paid for at $1 98 a foot, amounting to $65,989, when others of equal value and answering the same purpose could have been had at 65 cents a foot, amounting to $21,663 only?

But supposing that any number, even many, of these large blocks were required, it is certain that a *competent* architect could, at the beginning, have fixed their number, and calculated, to a foot, the size and shape of each block, large and small, that would be required; and if he were *faithful*, he would have made each item, so fixed and calculated, a specification in the contract. But this having been left vague and undetermined in the contract, a way was thereby left open for collision and fraud in the *execution* of the contract, to which the committee know no parallel, and of which, so far as the work has progressed, *the parties in interest* seem to have availed themselves with a promptitude, avidity, and freedom for which preconcert and arrangement alone could have qualified them for success. And frauds of this character, to a large amount, might be practised with success even under the terms of the contract, if strictly construed and adhered to throughout, according to the original *estimate* (as to the proportion of large and small blocks) upon which it was based. That estimate, as made by the architect, understood to be 100,000 feet in blocks more than 30 cubic feet, and 300,000 feet in blocks less than 30 cubic feet in size, would, of itself, as exemplified in the diagram, give an enormous profit to the contractor, at the unnecessary expense of the Government. And when it is considered that such an estimate is held by other persons, competent to make it, and as the common observation of any intelligent man will suggest, to be culpably extravagant—at least double, and perhaps threefold what it ought to be—it lays a foundation and furnishes facilities for fraud, only equalled by the avidity and success with which they have been availed of.

When examined more closely, however, this unwarrantable extravagance in the original estimate appears only an entering wedge to rive open the treasury, and fill every pocket of the contractors, and any confederates they might have, with the spoils. As an *estimate*, it was, of course, only an approximation to the actual proportion, leaving to *contingencies* and the discretion of the architect, during the progress of the work, to determine the exact proportion. What has been the character of those contingencies, and what the result of that architectural discretion, may be found by bearing in mind that this *estimate* was *one-fourth*, (100,000 out of 400,000 cubic feet,) and then comparing it with the architect's own letter, of February 14, where he shows the proportion of small and large blocks delivered up to that date, and exemplifying it by reference to the diagram, and the calculation of the Commissioner of Public Buildings. It will thus be found that, by a species of *architectural equation*, never heard of before, *three-fourths* are reduced to less than *one-fifth*, and, per contra, *one-fourth* is increased to more than *four-fifths*. All this being *in favor of the contractor* and *against the Government*, it is found, by a simple calculation to be as *fifteen* to *four* of gain to the former, and loss to the latter—that is, a clear gain to the contractors, upon the apparent terms of their contract, of more than *two hundred* per cent. profit, to the clear loss of the Government.

This general statement will be found substantially sustained by the particular estimates in the testimony of Mr. Robert Smith, whose high character as a man of intelligence and truth was vouched for by a Senator from New-York, (Mr. Fish,) in his place in the Senate, and sustained also by the architect's own letter already cited, and by the estimates and calculations of the Commissioner of Public Buildings, as illustrated by the diagrams. To all of which, as *demonstrations*, the committee again refer

From this, it appears that for the marble already (to February 14) received and paid for, at least $71,355 has been paid, when only $31,180 ought to have been paid, under the most liberal construction of the contract, upon the architect's own estimates; giving an excess of at least $40,178 to the contractor. And if the whole quantity of marble estimated for (400,000 feet) shall be received and paid for in the same proportion, and at the same rates, it will cost about $685,000; whereas, if received and paid for at the same rates, but in the *proportions* of the architect's own original estimates, (even which the committee think extravagant,) it would cost only about $326,000, the excess of $359,000 being the loss to the Government and the gain to the contractors, by this new and ingenious contrivance of the architect, in the art of framing the contracts and the business of executing them.

From the foregoing, it seems that, even in this *marble work* alone, a large portion of the money appropriated has already been unlawfully expended; and the arrangement was made whereby more than half of the sum to be set down to the cost of that work would be fraudulently taken from the Treasury and given as a gratuity to the contractors. And, taking this large item, with the other smaller irregularities, abuses, and frauds already set forth, and all together, as grounds of suspicion of other frauds which could not be so easily proved, the committee do not hesitate to express the opinion that at least *one third*, and perhaps *one half*, of the *million of dollars* which the *Capitol extension* is claimed to have cost to the present time, has, by negligence, incompetency, or

fraud on the part of the persons intrusted with the work, been lost to the Government for the private profit of the individuals engaged in it as contractors or otherwise, &c., &c.

The accuracy of the foregoing statement has since been fully verified by Mr. Walter's printed reports of the expenditures. In Ex. Doc. No. 1, 38th Cong., 1st ses, p. 669, he states, under date of the 1st of November, 1863, that up to that date, $2,419,749 48 had been paid for the exterior marble and marble work of the new wings of the Capitol, independent of $185,338 85 paid for inside marble work; and since that date two appropriations have been made to carry on this marble work, amounting to $450,000, which, added to the first amount of $2,419,749 48, will make $2,869,749 48, the amount which Mr. Walter states that this marble work has already cost; whereas the very same contractor who is executing this marble work offered, *in answer to the first advertisement for bids for this same work*, to furnish the marble, do the hauling, furnish the scaffolding, together with cutting and setting all the marble work of these two wings complete, for $773,918 48. Six other contractors offered each severally to complete this same work at different prices, all their estimates ranging under one million dollars. When it is understood that this sum of $2,869,749 48 does not include the cost of scaffolding or hauling, a fair estimate can be formed of the amount of the fraud practised on the Government in this one item of materials for the Capitol extension. But by investigation, it will be proved that similar frauds have been practised in the contract for the granite stone, and for the iron work of the dome. The frauds in the marble and stone work are effected by the means explained so accurately by the Senate committee's report, and in the iron work, which is paid by the pound weight, it is effected by the over and unnecessary weight of the castings, which excessive weight must eventually prove injurious to the structure.

The nature and extent of the existing frauds in the delivery of the rough marble will be more clearly understood by reference to Mr. Walter's statement in the same report, (page 669,) "That 467,754¾ cube feet had been delivered for the exterior work of the Capitol extension, up to that date, for which $823,482 69 had been paid, independent of $64,400 for the rough shafts of forty-six columns," whereas the original agreement with these same contractors insured to the Government the delivery of three fourths of the marble, or 300,000 cube feet of "*pure white marble, the same as the sample*," at sixty-five cents per cube foot.

At present it is all delivered in large blocks, much of it of an inferior quality, which are measured with the allowance of two inches on every side made to the contractors, instead of in favor of the Government or the purchaser, which would be in accordance with the rules of the trade, but which is reversed in this case, for the benefit of the contractors; this measurement is then paid for at the rate of $1 98 per cubic foot, after which they are cut up into smaller sizes for use, (as many of them as are required,) which sizes these same contractors had given security that they would deliver at the rate of 65 cents per cubic foot. The undersigned respectfully calls attention to these indisputable facts; first, to prove the accuracy of the Senate Committee's report of 1853, with which report he had nothing to do; and, secondly, to show to the Honorable Senators and the Honorable Representatives of the people, that by the correction of these frauds, (now in full practice,) five times the amount that will be required to establish a wholesome atmosphere, &c., &c., in the Halls of Congress can be saved, besides putting a stop to such demoralizing practices at the seat of Government. And the undersigned feels that he would not be acting the part of an honest, independent, and loyal citizen of the United States, which he claims to be, if he allowed Congress to remain ignorant of the fact, that there would be no use in referring these matters to the Interior Department, inasmuch as that all the transactions connected with these frauds, &c., and with the malconstruction of the Capitol Extension, had been fully spread before Secretary Usher after the supervision of these, and other works, had been again transferred from the War to the Interior Department, and before the originators of these frauds had been again restored to office, to effect which, different, honest, able, and respectable mechanics were dismissed, with the Secretary's knowledge, to make place for the old practiced offenders, and it can be satisfactorily shown that the plausible reasons given to Congress for so doing are absurdly false.

The undersigned respectfully submits, that there is no necessity for Honorable Senators and the illustrious Representatives of the people to risk their health, if not their lives, by continuing to submit to this bad and injurious ventilation, for economy's sake, while the United States Treasury is allowed to be defrauded out of millions with impunity, by a few unprincipled individuals, whose ingenuity in establishing these frauds is only surpassed by their reckless audacity, almost sufficient to evade suspicion.

While this building was progressing in this ruinous manner, (as above described by the Senate Committee,) the undersigned addressed the following communications to President Fillmore and to President Pierce, viz:

[Letter No. 1.] *April* 26, 1852.

To His Excellency, President Fillmore:

When you last honored me with an interview, you mentioned that, if Mr. Walter should not prove competent to direct the commencement of the works, you would send for me I therefore most respectfully take the liberty of bringing under your consideration the propriety of allowing me to regulate the preparations for the heating and ventilating, which are so closely connected with, and actually control the acoustics of both Houses, and to be of vital importance in this stage of the works, as such preparations will have to be made in the foundation walls previous to the superstructure being proceeded with.

I have investigated this matter particularly since I had the honor of presenting you with a copy of the accompanying pamphlet, descriptive of the system, assisted by different scientific men, and foreign authorities, and I cannot discover any room for improvement, or chance of failure, &c. I am, respectfully, &c,

CHARLES F. ANDERSON.

[Letter No. 2.] ARCHITECT'S OFFICE, NEW YORK, *June* 10, 1852.

To His Excellency, President Fillmore:

SIR: As I have not as yet been favored with a reply to my letter, addressed to your Excellency under date of the 26th of April, which was accompanied by a copy of the printed explanation I prepared at your request and delivered to you the day before I left Washington, I may suppose that you do not see the necessity of immediate attention to the subject-matter of that communication, of which I inclose a copy, fearing you may not have the original at hand; in support of which may I take the liberty of reminding you of Mr. Webster's views on this subject, which will, in a great degree, plead my excuse for thus forcing this matter, of such national importance, on your consideration.

The last day I attended your summons to Washington, to explain the ventilation and acoustics of my plans for the wings to you and the members of your Cabinet, Mr. Webster was attentive to the doctrines I adduced, and the authorities I submitted in proof thereof. After looking at my plans and hearing my explanations, he thus observed: "I have not time to attend to such business just now, although in itself of importance, as my head is full of matters connected with national interests of greater consequence. But this I know, from the intercourse I have had with other nations, and from all that I have seen and read on the subject, that this gentleman's explanation of what he intends by his plans is what is sought after and admitted by every enlightened nation of the present day as the nearest to perfection, and I have no doubt but we will have to come to that yet, as no climate requires such a system more than our own."

If a good speaking and hearing house is the object sought for by Congress, with a healthy atmosphere of a refreshing and comfortable temperature at all seasons, you will decidedly have to adopt Mr. Webster's opinion, as I am in a position to prove beyond all doubt that no building exists in any country possessing superior arrangements for the establishment of the objects in question, and, as a principal portion of such arrangements must be made in the foundation walls of the wings, I now most respectfully ask you to permit me to give the necessary instructions before more expense is incurred, by erecting walls that must of necessity be taken down again, even if they were as high as the cornice of the building, to insure perfection in the ventilation and acoustics, as I am quite aware there is no one connected with the works who has knowledge or experience in such matters, there being no plan presented, with the exception of my own, that was not in variance with this principle of acoustics and mechanical ventilation, and which assertion I respectfully submit is amply verified, (as far as Mr. Walter is concerned,) by your own judgment on his plans, which you declared to be *a filthy production, indeed,* reprimanding him at the same time for attempting to mislead you by his deception, and directing Mr. Stewart, the Secretary of the Interior, to mark his plans "rejected;" and, at the same meeting, your Excellency will recollect that you stated to my competitors that *you were bound to believe my plans perfect if none of them could show you to the contrary,* which was never attempted by either committees or architects, as they stand unimpeached, and were always highly approved by those who understand them, but are now mutilating by Mr. Walter.

I am, respectfully, &c.,

CHARLES F. ANDERSON.

[Letter No. 3.] WASHINGTON, *March* 17, 1853.

To His Excellency Franklin Pierce, President of the United States:

SIR: Considerations of public duty as well as of personal justice require that I should ask your indulgence in submitting a few remarks upon a subject interesting to the country, and no doubt particularly so to yourself.

Public rumor, as well as information received through the press, indicate that a change will be made in the architectural direction of the additions to the Capitol.

I not only made the designs for the present additions to the Capitol, but, by President Fillmore's desire, actually staked them out, and prepared printed explanations and instructions for proceeding with the works after Mr. Walter's plans were marked by him "rejected." Yet I was put aside, and my knowledge and experience handed over to others to act on. I therefore beg leave to exercise the privilege of an American citizen, not only to seek redress for this private wrong, but to prevent a public injury in the continued erroneous construction of these additions, which are well nigh gone too far to admit of correction, in order to secure the advantages of light, temperature, ventilation, acoustics, and peculiar accommodation for the purposes of legislation, together with exterior effect, without which they may be no better than the halls now used for that purpose. After the expenditure of millions, the whole would be a total failure, and all owing to the want of knowledge in such matters.

I am constrained to make these remarks from a recent inspection of the works, as I see no provisions whatever made for securing these advantages to the two halls of Congress.

The object of this application is to secure from your Excellency an opportunity to submit facts indispensably necessary to a just consideration of the subject; and I shall be favored if informed at what time it will suit your pleasure to grant an interview, for the purpose above stated, when some members of the Senate, &c., who are cognizant of these facts, will accompany me.

I am, respectfully, &c., &c., CHARLES F. ANDERSON.

CONCLUDING REMARKS.

The undersigned would respectfully ask attention to the following facts: That he furnished two sets of plans for the Capitol extension; the first in answer to the Senate Committee's advertised invitation, who selected a few designs from those presented under the advertisement, and from which they had a plan prepared by the government architect, Mr. Mills, after which they returned the plans to the several architects and divided the advertised premium of $500 among the authors of the plans which they had used, the undersigned receiving $100, Mr. Mills $100, Mr. Elliott $100, a gentleman from the Topographical Bureau $100, although he had no plan at all, merely an elevation, and $50 was retained by Senator Davis and $50 by Senator Clark to cover other expenses. It is shown by Senator Foot's report that the principal ingredients which composed this committee plan were obtained from the design furnished by the undersigned. Some months after, when this committee and Congress had dispersed, President Fillmore set about selecting a plan on which to commence the extension, as an appropriation had been made for that purpose. He accordingly invited architects to submit plans, and recommended the undersigned, after inviting him by letter from New York, his place of business, to modify his first design to more fully meet the wants of Congress, and delayed the selection of a plan for over a month while the undersigned was preparing his new design and plans, with a full explanation of the system by which he intended to ventilate the Halls of Congress; also extracts from published authorities in support of that system which President Fillmore wished the undersigned to furnish. This modified design and plans were much approved of by the President, Mr. Webster, and other members of his Cabinet, indeed all but Mr. Stuart, the Secretary of the Interior, who wished to have Mr. Walter employed, although both of Mr. Walter's designs (as he prepared a second one also) had been rejected. But even though Mr. Stuart succeeded and had Mr. Walter employed, even without a plan, *the foregoing Senate Committee's report of* 1853 *fully explains the result*. The different architects took away their plans without receiving one cent remuneration, not even their travelling expenses, and the undersigned had no more to say in the matter for two years (save the communication above specified) until the control of the works was transferred from the Interior to the War Department, and Captain Meigs placed in charge. In about two days after that circumstance, the undersigned was induced by Col. Alexander, of the United States Engineers, to go with him to Capt. Meigs's office, where he found Capt. Meigs apparently in waiting, who at once entered into arrangements to get from the undersigned his modified design and plans, with the explanations and extracts from the scientific authorities, which the undersigned had prepared at the suggestion of President Fillmore, and which plans and explanations had never been seen by the committee who disposed of the premium. The undersigned accordingly sent for these plans, &c., &c., and delivered them to Capt. Meigs in presence of Gen. Hickey of the Senate, and which design, plans, and printed explanations and instructions how to proceed with the work Capt. Meigs acted on, as is shown by his own reports, and by the plans when compared with the extensions as they are arranged, and for which plans, &c., the Senate Committee passed the bill No. 207, which was also unanimously recommended for payment by the House Committee, and is now on the private bill calendar.

All of which is respectfully submitted by

CHAS. FRED. ANDERSON,
Architect and Civil Engineer,
Washington, D. C.

IN THE SENATE OF THE UNITED STATES.

March 29, 1864.—Ordered to be printed.

Mr. Foot made the following

REPORT.

[To accompany bill S. No. 207.]

The Committee on Public Buildings and Grounds, to whom was referred the memorial of Charles F. Anderson, architect, submit the following report:

That the memorialist claims compensation for the time, labor, and professional knowledge and skill employed in conceiving, devising, and preparing plans for the extension, enlargement, and improvement of the Capitol building, in pursuance of a general invitation to the architects of the United States; claiming, also, that the principles and main features of his plan were adopted and made use of, and now appear in the building, so far as it has been executed; and claiming that, in several important particulars where his plans were not adopted, a detriment has resulted in the general effect, convenience, public utility, and salubrity of the building.

With a view of ascertaining the grounds and validity of this claim, your committee have found it necessary to refer to the proceedings relative to the subject, from which it appears that the design of enlarging the Capitol originated in the Senate of the United States, in the form of a resolution which was adopted in this body on the 26th of September, 1850, as follows:

"*Resolved*, That the Committee on Public Buildings be authorized to invite plans, accompanied by estimates, for the extension of the Capitol, and to allow a premium of five hundred dollars for the plan which may be adopted by the Committee on Public Buildings (acting jointly) of the two houses of Congress, to be paid out of the contingent fund of the Senate."

This resolution was founded upon a report from the committee, in which they stated that "they have come to the conclusion that there is a necessity for the enlargement of the present building."—(*Vide* printed Reports of Committees, Senate, 1st session 31st Congress, No. 145, May 28, 1850.)

In conformity with this resolution, the Committee on Public Buildings published a general invitation to architects to furnish such plans and estimates on or before the 1st of December, 1850. In this public notice the committee state that "although but one plan can be adopted, the committee reserve to themselves the right to form such plan, by the adoption of parts of different plans submitted, *should* such course be found necessary; in which event the committee also reserve to themselves the right to divide, or apportion, according to their own judgment, the amount of premium to be awarded for the whole plan to those whose plans may, in part, be adopted, according to the relative importance and merit of each part adopted."

This notice was published in the National Intelligencer, and other papers in Washington city, daily, from the 30th of September to the 21st of October, 1850, inclusive.

It appears in evidence that, immediately after the appearance of this invitation, the claimant, Charles F. Anderson, came from the city of New York, where he was practicing his profession of architect, to this city, and taking the dimensions, proportions, and elevations of the old building, he entered into a critical and minute inquiry and examination, first, as to what would be required, in every respect, for the accommodation and convenience of the two great halls of legislation, the Senate and House of Representatives; and, secondly, as to the accommodation of the presiding and other officers, and offices and the committees of the two houses—all with reference to the greater convenience of the public business and the members of the two houses of Congress

After thus preparing himself upon the ground, he returned to New York, where he prepared the plans and estimates required, from the conceptions he had formed, based upon the knowledge he had acquired from his personal investigations and practical information received from experienced members and officers of the two houses, and, within the time prescribed in the notice, he presented his plans and estimates as directed.

The plans of the several architects having been laid before the Committee on Public Buildings, they found a difficulty, in consequence of conflicting views and opinions, to adopt, in express terms, either of the plans proposed; but they selected from the whole number four of the plans as having most merit, and divided the premium equally among the four architects who were the authors of those plans, Mr. Anderson being one of the recipients of this award.

In the report of this committee (No. 273, 2d session 31st Congress, made on the 8th of February, 1851) they state that they have "received and considered plans presented by many distinguished architects; and after an attentive study and patient investigation, in which they were aided by the explanations of each architect by whom plans were presented, have concluded to recommend the addition of wings, attached to the north and south ends of the Capitol and placed at right angles to its axis, as shown in the accompanying drawing"—which drawing was compiled by an architect (Mr. Mills) whom they employed for the purpose.

On a careful examination of this report, however, it will be seen that the main features and principles adopted by the committee, and plainly described in the report, correspond with Mr. Anderson's plans as now exhibited to your committee.

The plan thus described and approved by the Committee on Public Buildings became obsolete by the operation of an act of Congress, which is described by the President in his annual message of December, 1851, (page 23.) He stated that "An act of Congress, approved 30th September, 1850, contained a provision for the extension of the Capitol, according to such plan as might be approved by the President, and appropriated $100,000 to be expended under his direction, by such architect as he should appoint to execute the same. On examining the various plans which had been submitted by different architects, in pursuance of an advertisement by a committee of the Senate, no one was found to be entirely satisfactory, and it was therefore deemed advisable to combine and adopt the advantages of several."

The President having thus adopted a plan, the corner-stone of the extension of the Capitol was laid with suitable ceremonies on the 4th day of July, 1851. In this plan, adopted by President Fillmore, although a few of the external features of Mr. Anderson's plan were retained, it differed entirely from his interior arrangement. It located the halls of the two houses of Congress in the western ends of the north and south extensions, respectively, and otherwise differed altogether from Mr. Anderson's plans.

This fact is sufficiently manifest from the description of the plan adopted by President Fillmore, made by the architect appointed by him, in his report of the 23d of December, 1851, which was communicated to Congress by message on the 10th February, 1852, (*Vide* Ex. Docs. Senate, vol. 7, No. 33.)

Dissatisfaction with this plan was manifested by proceedings in the Senate on the 16th March, 1852, directing the Committee on Public Buildings to make a thorough examination of the work thus far executed on the extension of the Capitol, and to obtain the aid of the United States topographical engineers and other persons; and on the 24th March, 1852, the President of the United States was called upon by a resolution of the Senate "to communicate to the Senate any plan which may have been adopted for the extension of the Capitol;" "what, if any, plan has been adopted to insure the proper lighting, warming, and ventilating the several departments of the proposed extension; and what, if any, plan of construction has been adopted with reference to the principles of acoustics in order to facilitate hearing in each of the two halls of legislation and in the Supreme Court."

This resolution was answered by message on the 29th March, 1852, communicating a report from the architect exhibiting the plans asked for, which, with the exception of a few general external features, differed entirely from Mr. Anderson's plan. (*Vide* Senate Ex. Docs., vol. 8, No. 52.)

The Committee on Public Buildings also investigated the subject as directed by the Senate, and made a report, accompanied by statements of several United States engineers, on the 2d of April, 1852. (*Vide* Senate Reports, Vol. 1, No. 163.)

By the order of the President of the United States, the work for the extension of the Capitol was, on the 23d of March, 1853, transferred from the Department of the Interior to the War Department, viz:

"EXECUTIVE OFFICE, *March* 23, 1853.

"Believing that the public interests involved in the erection of the wings of the United States Capitol will be promoted by the exercise of a general supervision and control of the whole work by a skillful and competent officer of the corps of engineers, or of the topographical corps, and as the officers of those corps are more immediately amenable to the Secretary of War, I hereby direct that the jurisdiction heretofore exercised over the said work by the Department of the Interior be transferred to the War Department, and request that the Secretary of War will designate to the President a suitable officer to take charge of the same.

"FRANKLIN PIERCE."

The Secretary of War in his annual report to the President, dated 1st December, 1853, states that "the work for the extension of the Capitol has been prosecuted with due diligence under the special charge of Captain M. C. Meigs, of the corps of engineers; and it gives me pleasure to bear testimony to the manner in which that officer has discharged his duty—fully sustaining his reputation for professional skill, zeal, and fidelity. He was placed upon this duty April 5, 1853, and directed specially to examine into the condition of the foundation, which had been previously laid, and minutely to inquire into the arrangements for warming, ventilating, speaking, and hearing.

"The arrangements for ventilation and hearing were not found satisfactory; and these being the great objects sought in the proposed extension, certain alterations in the plans were designed, and a board, composed of Professors A. D. Bache and Joseph Henry, was commissioned May 20, 1853, to make inquiries upon acoustics and ventilation, as connected with the adopted plan and proposed alteration. After full examination of the various rooms visited, and a discussion of the phenomena presented, they reported on the 24th of June last in favor of the modifications of the plans for the extension of the Capitol as proposed by Captain Meigs.

"In addition to this special object, the modifications proposed were believed otherwise to increase the convenience and facilitate the intercourse of the houses of Congress, and materially to add to the architectural effect of the building. As soon as the plans submitted received your approval, the consequent changes in the foundation walls were pressed with all possible rapidity, and the work has, since then, been steadily prosecuted." (*Vide* part H, Ex. Doc. No. 1, pages 32, 33.)

These remarks of the Secretary of War show a change in the plan of the Capitol extension as adopted by President Fillmore by the then President, Franklin Pierce. And the change appears to have been radical.

In the order of the Secretary of War assigning Captain M. C. Meigs "to take charge, under that department, of the public interests connected with the extension of the Capitol," &c., and dated the 4th April, 1853, he is directed to proceed "to take such measures as may be necessary for the proper execution of these works."

"As upon you will rest the responsibility for the proper and economical construction of these buildings, you will consider yourself fully empowered to make such changes in the present administration as you may deem necessary, and to regulate the organization hereafter as your experience may dictate.

"You will examine the arrangements for warming, ventilation, speaking, and hearing. The great object of the extension of the Capitol is to provide rooms suitable for the meeting of the two houses of Congress—rooms in which no vitiated air shall injure the health of the legislators, and in which the voice from each member's desk shall be easily made audible in all parts of the room. These problems are of difficult solution, and will require your careful study."

In the official report of Captain Meigs to the Secretary of War, dated October 22, 1853, he made the following remark:

"In examining the plans of the halls intended for the meeting of Congress, I became satisfied that they were not such as to promise a favorable result."

He here speaks of the plans prepared by the architect under the direction of President Fillmore.

Captain Meigs goes on to say: "After a careful study of the subject, I caused plans to be prepared in accordance with the views set forth at length in my letter to you of 19th May, 1853."

The commission, consisting of Professors Bache and Henry, to examine the plans submitted by Captain Meigs as regarded ventilation, acoustics, light and heat, reported, on the 24th of June, 1853, "That the principles presented to them by Captain Meigs, are correct, and that they are judiciously applied.

"That the plans should be provisionally adopted, in order that the building may not be delayed, subject to such modifications in the details as may result from further study of them by Captain Meigs, or from the experiments and observations of the commission.

"This general adoption of the plans will not, it is believed, interfere with any changes of details likely to be found desirable."

Captain Meigs then stated: "Upon receipt of this report and your recommendation, the President (Franklin Pierce) adopted the plans which had been prepared for the south wing, and its construction was immediately commenced.

"The plans for applying the same principles to the north wing were prepared as soon as possible, and received the approval of the President upon the 5th of July, 1853.

"These plans were prepared by the accomplished architect, (Mr. Thomas U. Walter,) and I am happy in being supported by his opinion, that not only will the legislative halls be better adapted to their main purpose as rooms for debate, but that the architectural beauty and the convenience of the buildings will be increased by the changes which have been made.

The position of the hall of representatives in the centre of the south wing allows it to be surrounded by retiring, conference, and committee rooms, post office, offices of the Clerk of the House, &c., of easy access."—(This is Anderson's conception and plan.)

"In the plan of the south wing, under construction, when I was placed in charge of this work, all the offices of the House, all the committee rooms, retiring rooms, &c., (by President Fillmore's plan,) were separated from the hall by a broad corridor, open to the public, and the only entrance to or from the House was through this corridor.

"The principal floor contains, besides the hall of representatives, the vestibule, the corridors, and grand staircases, and fourteen well-lighted rooms, (by President Pierce's plans.)

"The hall of the Senate is arranged upon the same principles as are applied to the House of Representatives. Its smaller size renders it less difficult to construct, and leaves room for larger and more magnificent corridors and retiring rooms.

"The suite of apartments, embracing the senators' retiring room, the Vice President's room, conference rooms, and their approaches, will be of unrivalled beauty.

"The changes in the plans rendered necessary extensive alterations in the foundation walls."

For this report of Captain Meigs *vide* Ex. Docs. H. R., vol. 1, part 2, page 69.

In the letter of Captain Meigs to the Secretary of war, dated May, 19, 1863, referred to in his report of October 22, 1853, he stated: "I have the honor to enclose a report prepared by the architect of the United States Capitol, giving the history of the formation of the plans for the extension of that building now under construction.

I have attached to his plan (G) a fly, showing the arrangements which I have recommended for securing a better hall of representatives than is provided by the plans heretofore proposed.

I will only repeat my own conviction that the proposed change will secure a better room for speaking and hearing and better accommodations for the members and officers, and business of the House.

I am happy in being supported by the opinion of the architect, (Mr. Walter,) who says, as you will perceive, that the alterations, besides securing these advantages, will enhance the beauty of the hall.

(*Vide* same doc. as preceding, page 79.)

In the foregoing report of 19th May, 1853, Captain Meigs states that he had "prepared some notes upon the application of the general principles of acoustics and ventilation, which have guided me in devising the plan which I proposed." These notes were submitted to Professors Bache and Henry, and deliberately examined and fully approved by them.

(*Vide* same doc. as preceding, pages 80 to 86.)

The committee deem it unnecessary to extend these quotations further than to show the relations which existed between the plan first adopted by the committee of the Senate and the plan presented to them by Mr. Anderson, and also between the plan prepared by Captain Meigs and adopted by President Pierce, and executed by Captain Meigs, as now shown by the building itself and the plans of Mr. Anderson.

The committee, in their report of 8th of February, 1851, say that they "have concluded to recommend the addition of wings, attached to the north and south ends of the Capitol, and placed at right angles to its axis.

The Committee have adopted the mode of extension represented in the accompanying plan, combined from various sources, especially from the drawings submitted to the committee according to invitation publicly given.

"This plan secures the requisite accommodation in a compact and convenient form. The amount of light will be greater than in the plan of extension by duplicating the building. The wings will be so exposed on all sides to the external air as to afford the most ready means of ventilation. Both wings will have an unobstructed view to the east and the west—one having also an exposure to the north, and the other to the south. *By retiring the wings, the heavy embankment will be avoided, which would be necessary if they were brought up to the line of the west front of the present building.*" "The centre of the rotunda, now the radiating point of the avenues and principal streets, will, by the proposed extension to the east, become the centre of the Capitol building.

"The defect of the eccentric position of the dome, as viewed from the north or south, will be remedied, and this prominent feature will appear securely adjusted on the structure, instead of pressing with painful effect on one side. The limit to which the present building may be increased in length, without impairing its architectural effect, is believed to be within the space required for accommodation; *but, by receding the wings as is proposed, the apparent length of the building in a north and south direction will be diminished,* *and this objection against the plan of extension by the prolongation of the present wings will be overcome.*

"It is proposed to break the long horizontal line of the roof by *an elevation over each wing, through which the chamber of the Senate and the Hall of Representatives may be lighted.*"

It is only necessary to compare the preceding description by the committee, of the composite plan adopted by them, with the plan presented to them by Mr. Anderson, to discover the similarity or identity of the two.

This plan of the committee was, however, discarded by President Fillmore, who adopted a plan of his own, differing entirely from that of the committee; which plan of President Fillmore was, in turn, discarded by President Pierce, who approved a radical change of the entire plan, the credit for which change was mainly owing to the judgment, skill, and high qualifications of that able engineer, Captain Meigs, in adopting and directing the execution of the existing plan, so far superior, as it is, to the plan of President Fillmore.

In the formation of this plan by Captain Meigs, he, of course, availed himself of the lights, plans, drawings, opinions and judgments of the architects who had devoted much time and attention to the subject, besides employing his own mind in the important inquiry as to the accommodations actually needed for the two houses of Congress, their committees, officers and offices, and the public attending the proceedings of the two houses.

It is known that Captain Meigs had one or more interviews with Mr. Anderson, with full explanations of his plans, both interior and exterior, and it would not be unreasonable to suppose that he would avail himself of every useful suggestion to be derived from such an opportunity and it remains only to be seen by a comparison of the building with the plans of Mr. Anderson to discover whether there is any similarity or identity between them.

The separation of the wings from the old building by connecting corridors; the colonnades on the east, north, and south, and west sides, are similar, as well as the exterior of both wings.

The difference is, the west front of the wings extend out to the line of the west front of the centre or old building, while in Mr. Anderson's plan, the west fronts of the wings recede more than eighty feet from the line of the western projection of the old building, which would have made a larger court on the east, and avoided the heavy embankment and doubtful or bad foundation of the western walls.*

On the main floor of the wings containing the Senate chamber and hall of the House, both being placed in the interior or centre, with the other rooms for the committees, officers, and offices surrounding, but separated by corridors from those halls, while the two are not precisely identical, the general similarity and resemblance are too strong to doubt that Mr. Anderson's plan furnished the idea and suggestion by which this floor in both wings was arranged. Mr. Anderson's was the only plan that located the halls in the centre, as they now exist.

The difference is, that Mr Anderson arranged the rooms somewhat differently, and but slightly so, and his plan did not contain the large marble stairways, the space occupied by them being appropriated by him to rooms, and his stairways to the galleries being in another position where room for them could better be spared, and where the crowds attending the galleries would not interfere with the main floors of the building.

The Senate chamber and hall of the House of Representatives, in locality and general form, are similar, the difference being that, by Mr. Anderson's plan, there is a different arrangement for lighting the rooms from the roof, while his mode of heating, ventilating, and securing the acoustics is different from those now existing in those halls. Indeed, it would appear that the present arrangements to secure those highly important objects do not correspond with the principles laid down upon the subject by Captain Meigs in his "notes on acoustics and ventilation with reference to the new halls of Congress in May, 1853," which were examined and approved by Professors Bache and Henry. These notes will be found in Ex. Docs. H. R, vol. 1, part 2, page 80; from which it will appear that the present mode of heating and ventilating the halls is diametrically the reverse of what is there laid down; the reasons for which, so far as the committee are aware, have not been stated.

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*In the investigation of this whole subject the committee have had reason to believe that, had Mr. Anderson's plan been adopted and executed, great public advantages would have been secured and much additional expense avoided.

The disadvantage of departing from Mr. Anderson's plan upon this point was made apparent by the report of Captain Franklin, who succeeded Captain Meigs in charge of the Capitol extension, dated 6th November, 1860, (Ex. Docs. Senate, vol. 2, No. 1, page 174,) in which he said, in July last, "levels were taken of all the corners of the two wings of the Capitol extension." "The west of the south wing is 4⅛ inches lower than the east side, and, at corresponding points in the north wing, the west side is 2⅞ inches lower than the east side."

Had Mr. Anderson's plan of retiring from the western line of the old building been adopted to the solid ground, such settling of the foundations would have been avoided.

Mr. Anderson's plans for lighting, heating and ventilation of the halls of Congress and the several apartments of the two wings, which, it has been stated, had been submitted to Captain Meigs, coincided entirely with the notes on those subjects which were prepared by Captain Meigs, and thoroughly examined and approved by Professors Bache and Henry.

The only difference in those plans appear to be, that Mr. Anderson's plans furnished an apparatus for drawing down through the openings in the floor the carbonic acid gas, or foul air, and dust, as it might be generated and collected in the halls, while the pure air brought from without the building, at a proper elevation, was subjected to the proper process to regulate its temperature and forced into the halls above the cornice. This pure air thus introduced above, by the drawing or exhaustive process beneath the floor, would be gently and equally drawn down, furnishing a constant supply to every person in those halls of pure air of the desired temperature wherein to breathe and exercise the lungs and voice, and avoiding all sudden horizontal and external currents of air which disturb the sound and render hearing difficult.

Upon a further examination of Mr. Anderson's plans, it has been found that several important items in them have not been, as yet, used or provided for in the arrangement of the building, and which, from their importance, your committee, charged with the whole subject of the public buildings, deem it their duty to bring to the notice of the Senate.

1st. By a different arrangement of the roof of each hall, substituting a solid roof covered with copper instead of the glass, which, in storms of hail, rain or wind, interrupt the proceedings, and introducing the light in more liberal volume, which will remove the partial darkness which now prevails, at noonday, in back parts of the galleries.

2d. To open a passage or corridor of proper width through the old north wing of the building into the rotunda, lighting the same from the roof, and removing the present narrow, dark, crooked, unbecoming, and, in crowds, excessively inconvenient passage to and from the Senate to the other parts of the Capitol. The communication between the two houses of Congress being constant during the sessions of two houses on the part of the members and officers, renders it indispensably necessary that a clear and unobstructed passage should be afforded. The present condition of that passage, and the damp and cold currents of air arising from the open circular colonnade well, and stairways from the basement floor, are too well known to all using that passage to render it necessary further to remark upon this serious inconvenience.

3d. To enlarge in an ample and sufficient manner the Congressional Library, which is, even at this time, greatly in want of additional room, and by the enlargement, to improve the architectural appearance and effect of the western front, which at present, including the north and south extensions, present a long monotonous line of attic or top, and which the proper arrangement of judiciously constructed towers at the north and southwest corners of the western projection of the old building and the proper upper works to the north and south extensions, would cover the proper arrangement of the roofs of the two halls as stated in the first item, and remove all the monotony in the long unbroken line of the top of the building from north to south when viewed from the west.

The committee have thus extended their investigations and remarks, perhaps, beyond what might probably be considered strictly applicable to the case before them, but they have found it difficult, in the progress of their examinations, to separate this case from the whole subject, and have become satisfied that Charles F. Anderson, from the time that himself and other architects of the United States were invited by a committee of the Senate to prepare plans and estimates for the extension of the Capitol, has bestowed a faithful, anxious and persevering attention to the subject; that he has occupied much time and labor, incurred considerable expense in making plans, and estimates, in travelling backward and forward between New York, (his then place of residence,) and this city, and remaining here on board for long periods of time, on many occasions attending on the committees of Congress and the executive departments of the government and its officers in reference to these plans; and the committee, from an actual inspection of Mr. Anderson's plans, and a comparison of them with the extensions as they now exist, believe that his original conceptions and plans have entered, to a considerable extent, into the existing construction of the Capitol extensions; and that the government may avail itself still further of his plans in the further necessary improvements of the building, the committee recommend the retention of all Mr. Anderson's plans and drawings, and deem it but an act of simple justice to him to make an adequate compensation for the time, professional skill, labor, and expense which he has bestowed upon this subject for so long a continued period of time, to the neglect and detriment of his regular professional business: and they therefore submit a bill for his relief, and recommend its passage.

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